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Open File Report 6079

Report of Activities, 2001
Resident Geologist Program

Red Lake Regional Resident Geologist Report:
Red Lake and Kenora Districts

2002

Ontario

ONTARIO GEOLOGICAL SURVEY

Open File Report 6079

Report of Activities, 2001
Resident Geologist Program

Red Lake Regional Resident Geologist Report:
Red Lake and Kenora Districts

by

A. Lichtblau, P. Hinz, C. Ravnaas, C.C. Storey, L. Kosloski and A. Raoul

2002

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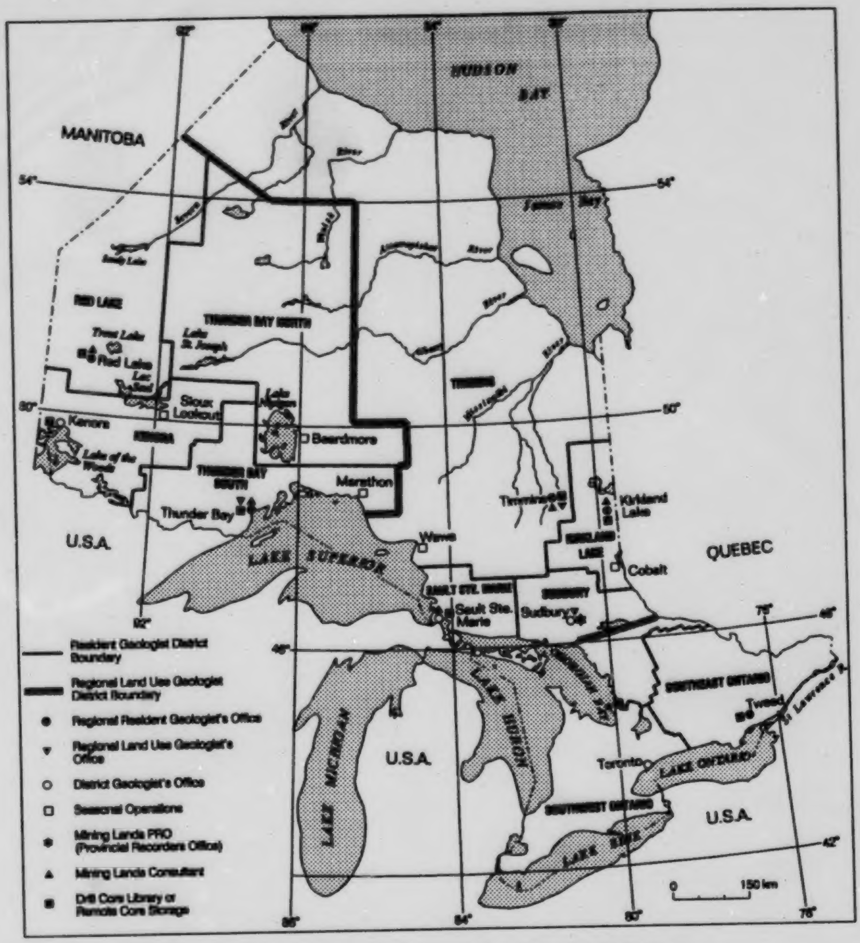
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RED LAKE
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Red Lake
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Lake Nipigon
Kenora
KENORA
Lake of the Woods
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Kirkland Lake
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Cobalt
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ONTARIO GEOLOGICAL SURVEY

RESIDENT GEOLOGIST PROGRAM

REPORT OF ACTIVITIES - 2001

RED LAKE REGIONAL RESIDENT GEOLOGIST REPORT

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by

A. Lichtblau, C.C. Storey and L. Kosloski

2002

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RED LAKE REGIONAL RESIDENT GEOLOGIST (RED LAKE DISTRICT)—2001

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INTRODUCTION

Gold continues to be the only commodity mined in the Red Lake District. Total production relative to the previous year more than doubled, to a total of 681 524 ounces, due solely to full production of very high grade reserves at Goldcorp Inc.'s Red Lake Mine (Table 1). The price of gold rose approximately 5% over the year, gradually climbing to approximately US$278 at year-end.

Table 1. Mine production and reserves in the Red Lake District in 2001.

Mine	Production to end of 2000		Production in 2001		Reserves at end of 2001	
	Tonnage @ Grade	Total Commodity	Tonnage @ Grade	Total Commodity	Tonnage	Grade
Goldcorp Inc. Red Lake Mine	74 148 tons @ 1.57 ounces per ton gold	85 115 ounces Au	246 618 tons @ 2.26 opt Au (223 728 tonnes @77.50 g/t gold)	503 385 ounces Au	3 208 000 tons (2 910 000 tonnes) (1)	1.34 opt Au (46.04 g/t gold)
Placer Dome (CLA) Ltd. Campbell Mine	473 000 tonnes @ 15.7 g/t gold	229 408 ounces Au	438 000 tonnes @13.3 g/t gold (482 800 tons @ 0.388 opt Au)	178 139 ounces Au	1 941 000 tonnes (2 139 600 tons) (2)	16.7 g/t gold (0.487 opt Au)

(1) News release, Goldcorp Inc. February 7, 2002
(2) News release, Placer Dome (CLA) Ltd. February 14, 2002

Forty-nine exploration programs were carried out in the Red Lake District in 2001. Claim staking activity was similar to previous years (Table 2), although the focus of new staking activity was in the Birch–Uchi and Confederation greenstone belts, where gold and base metals were the commodities sought; along the Bear Head fault, in the Berens River Subprovince, where rare metals were the prime target; and in the Sachigo Subprovince, where diamonds were the focus of staking and exploratory drilling.

Table 2. Summary of claims recorded in the Red Lake District, 2001

Year	Claim Units Cancelled	Claim Units Recorded	Claim Units Active
2001	290	291	2269

Staff of the Resident Geologist's office made 23 visits to active and inactive mineral properties during the year, focussing on delivering high quality services to the exploration and mining sector, and explaining the role of minerals and mining to the public.

MINING ACTIVITY

Gold production in Red Lake continued at Placer Dome (CLA) Ltd.'s Campbell Mine and Goldcorp Inc.'s Red Lake Mine. Historical statistics for all producers in the district are given in Table 3.

Table 3. Gold production in the Red Lake District to December 31, 2001.

MINE	YEARS OF PRODUCTION	ORE MILLED (SHORT TONS)	GOLD PRODUCED	
			TROY OUNCES	OUNCES PER TON
CAMPBELL	1949–PRESENT(1)	17 979 851	10 335 248	0.575
GOLDCORP (DICKENSON)	1948–PRESENT(2)	8 619 008	3 736 704	0.434(3)
MADSEN	1938–1976, 1997(4)–1999	8 678 143	2 452 388	0.283(5)
COCHENOUR-WILLANS	1939–1971	2 311 165	1 244 279	0.538(6)
MCKENZIE RED LAKE	1935–1966	2 353 833	651 156	0.277
HOWEY	1930–1941, 1957(7)	4 630 779	421 592	0.091(8)
HASAGA	1938–1952	1 515 282	218 213	0.144
STARRATT OLSEN	1948–1956	907 813	163 990	0.181
BERENS RIVER	1939–1948	560 607	157 341	0.281
UCHI	1939–1943	757 074	114 467	0.151
JASON (ARGOSY)	1934–1952	276 573	101 875	0.368
H.G. YOUNG	1960–1963	288 179	55 244	0.192
SACHIGO RIVER	1938–1941	46 457	52 560	1.131
MCMARMAC	1940–1948	152 978	45 246	0.296
GOLD EAGLE	1937–1941	180 095	40 204	0.223
JACKSON MANION	1934–1940	105 357	27 142	0.258
RED LAKE GOLD SHORE	1936–1938	86 333	21 100	0.244
HUDSON PATRICIA	1936–1937	11 228	1857	0.165
BUFFALO	1981–1982	31 986	1656	0.052
ABINO	1985–1986	2733	1397	0.511
LAKE ROWAN	1986–1988	13 023	1298	0.100
KOSTYNUK BROTHERS	1963–1966	577	1126	1.951
BOBJO	1929	N/A	362(9)	N/A
BATHURST	1927–1937	562	307	0.546
RED SUMMIT	1935–1936	591	277	0.469
MOUNT JAMIE	1976	552	265	0.48
SOL D'OR	1933–1936	458	258	0.563
MCFINLEY	1987	N/A	N/A	N/A
TOTAL		**49 511 237**	**19 847 562**	**0.401**

NOTES: (1) Includes final production figures for 2001.
(2) For 1997, 1998 and 1999 no production due to strike by unionised employees.
(3) From 1970, includes production from Robin Red Lake.
(4) Includes clean up ore and materials from the mine site.
(5) Historic grade, actual grade for 1999 was 0.14 ounce per ton gold.
(6) Includes production from Annco and Wilmar properties.
(7) Continuous production 1930 to 1941; includes 268 ounces recovered from clean up in 1957.
(8) The ore mined at Howey, before sorting totalled 5 158 376 tons.
The average production from run-of-mine ore was therefore 0.0817 ounce per ton gold.
(9) Not included in total production figure
N/A Data not available

Goldcorp Inc.—Red Lake Mine

Gold production increased by 490% over previous year's results, primarily as a result of a full year's production coupled with increased daily mill throughput (from 403 to 676 tons per day) and increased headgrade (from 1.57 to 2.26 ounces of gold per ton). Recovery increased slightly from 86.7% to 88.5%; total operating cost was US$92 per ounce gold, with cash costs at US$59 per ounce gold.

Ore reserves at year end 2001 stand at:

Category	Tons	Grade ounces gold per ton	Contained ounces gold
High Grade Ore			
Proven	1 226 000	2.25	2 752 000
Probable	624 000	1.68	1 049 000
Sub-total	1 850 000	2.05	3 801 000
Sulphide Ore			
Proven	361 000	0.40	143 000
Probable	997 000	0.36	364 000
Sub-total	1 358 000	0.37	507 000
Total Reserves	**3 208 000**	**1.34**	**4 308 000**

Underground exploration drilling confirmed economic gold mineralization, at depth beneath the High Grade Zone ('HGZ'), east of the mine workings, and in deep sulphide type mineralization. Current HGZ reserves are calculated to a depth of 1768 m (5800 feet); drilling during the year and a substantial program scheduled for 2002, is designed to prove the down-plunge extension to 2134 m (7000 feet). The deepest intersection to date returned 5.41 opt Au over 8.0 feet (185.5 g/t over 2.4 m) at a depth of 2061 m (6763 feet).

Several significant new intersections were obtained in the Far East Zone, approximately 366 m (1200 feet) east of the easterly limit of previous mine development. Of three sections drilled, one of them showed continuous significant mineralization over a vertical extent of 152 m (500 feet), while the others returned anomalous gold intersections. Multiple intersections of anomalous gold mineralization were encountered in a number of drill holes completed below the 37 level (below 1692 m, or 5550 feet). Sulphide-type mineralization has now been identified 610 m (2000 feet) below the deepest area previously mined.

The mine had 108 company and 274 contract staff employed at year-end; Claude Lemasson was Mine Manager.

Placer Dome (CLA) Ltd.—Campbell Mine

The Campbell Mine has been in continuous production since 1949 and has produced over 10 million ounces gold. Production set-backs in 2000, due to rockbursts and mechanical problems in the ball mill, were addressed early in 2001, when Jacques Perron took over as Mine Manager in the first Quarter. The internal re-organisation and cost-cutting measures implemented during the year by Placer Dome (CLA) Ltd., positively affected the financial performance of the operation in the last Quarter of 2001. In the future, the use of traditional long-hole mining methods will be reviewed, with emphasis on decreasing dilution with tighter blast hole control.

Approximately 59 400 m (195 000 feet) were drilled in underground definition, exploration and grassroots programs. The Deep Campbell ('DC') zone below the 39th Level has received increasing attention and will constitute a significant addition to the reserve base. Multi-ounce gold assays are reported from drill intercepts in this composite vein system, which has been traced to at least the 42 Level. Ore reserves at year-end are:

Category	Tonnes	Grade g/t	Contained ounces gold
Proven	931 000	17.6	526 000
Probable	1 010 000	15.9	517 000
Total Reserves	**1 941 000**	**16.7**	**1 043 000**

A 339 000 ounce decrease in contained ounces gold is reportedly due to transfers from reserves to resources, changes due to geological remodelling and the impact of a decrease in gold price from US$300 to US$275 per ounce (Company news release, February 14, 2002).

The mine had 332 employees at year-end and Jacques Perron was Mine Manager.

EXPLORATION ACTIVITY

Assessment work received is listed in Table 4, and a summary of exploration activity is given in Table 5. Generally low commodity prices, including gold, hampered the financing capabilities of base and precious metal explorers. Rare metal (e.g., tantalum, cesium, lithium) prices fared relatively better, and exploration for these elements increased in the district, including interest in diamonds in the area north of latitude 51°.

Table 4. Assessment files received in the Red Lake District in 2001.

Abbreviations

AEM	Airborne electromagnetic survey
AM	Airborne magnetic survey
ARA	Airborne radiometric survey
Beep	Beep Mat survey
Bulk	Bulk sampling
DD	Diamond drilling
DDH	Diamond drill hole(s)
DGP	Down-hole geophysics
GC	Geochemical survey
GEM	Ground electromagnetic survey
GL	Geological Survey
GM	Ground magnetic survey
GRA	Ground radiometric survey
Grav	Gravity survey
HLEM	Horizontal loop electromagnetic survey
HM	Heavy mineral sampling
IM	Industrial mineral testing and marketing
IP	Induced polarization survey
Lc	Linecutting
MMI	Mobile Metal Ion soil sampling survey
OD	Overburden drilling
ODH	Overburden drill hole(s)
PEM	Pulse electromagnetic survey
PGM	Platinum group metals
Pr	Prospecting
RES	Resistivity survey
Samp	Sampling (other than bulk)
Seismic	Seismic survey
SP	Self-potential survey
Str	Stripping
Tr	Trenching
UG	Underground exploration/development
VLEM	Vertical loop electromagnetic survey
VLFEM	Very low frequency electromagnetic survey

Township or Area	Company Name	Year	Type of Work	AFRO Number (Report of Work Number)*
Baird Township	Cypress Development Corp. (English Option)	2000	DDH(7)=900M, Samp, Assays	2.20937 (32-2001)
Baird Township	Madsen Gold Corp (Claude Resources /Placer Dome Canada Ltd. (Madsen Mine)	2000	GL	2.21332 (54-2001)

Township or Area	Company Name	Year	Type of Work	AFRO Number (Report of Work Number)*
Baird Township	Madsen Gold Corp (Claude Resources /Placer Dome Canada Ltd. (Madsen Mine)	1998	DDH(7)=2007', Assays	2.21326 (46-2001)
Baird Township	Meunier, David (St. Paul Bay)	2000	Lc, Tr, VLF-EM	2.20755 (88-2000)
Baird Township	Meunier, David (St. Paul Bay)	2001	GM, VLF-EM	2.20987 (43-2001)
Ball Township	Melville, R. W.	2000	Pr, Samp, Re-cutting Claim Lines	2.20560 (70-2000)
Ball Township	Rubicon Minerals Corporation (North Pipestone Property)	2001	Str, Samp, Assays	2.222085 (30726-2001)
Ball Township	Rubicon Minerals Corporation (South Pipestone Bay Property)	2001	Str, Tr, Samp, Assays	2.21606 (30311-2001)
Ball and Mulcahy Townships	Goldcorp Inc. (Trout Bay Block)	2000	AMAG, AEM, VLF-EM, Gamma Ray Surveys	2.20753 (84-2000)
Balmer Township	Royal Roads Corp. (Adams Lake Gold Property)	1999-2000	GL, Pr, Samp, Assays, Lithgeochem, Gradient Resection TDIP Survey	2.20614 (76-2000; 77-2000)
Bateman Township	Placer Dome (CLA) Ltd. (East Bay Property)	2001	DDH(2)=1908', Samp, GC	2.21053 (53-2001)
Bateman Township	Placer Dome (CLA) Ltd. (Hoyles Bay Property)	2001	DDH(2)=607M, Samp, GC	2.21056 (55-2001)
Bateman Township	Placer Dome (CLA) Ltd. (North Loner Claim Property)	2001	Str	2.21054 (54-2001)
Bateman Township	O. Rivard (Cross Island Property)	2000	DDH(1)=317' (deepening hole from 917' to 1234'), Assays	2.20938 (33-2001)
Bateman Township	Stechishen, A. (North Bateman Property)	1999-2000	Lc, Pr, GM, VLF, soil GC, Beep, Samp, Assays	OP99-394
Bateman Township	Stechishen, A. (North Bateman Property)	2000	GM	2.21409 (30115-2001)
Bateman, Dome, Fairlie, McDonough, and Todd (Hammell Lake Area) Townships	Rubicon Minerals Corporation (Red Lake Property)	2000	Lithogeochem Samp, Assays	2.20719 (83-2000)

Township or Area	Company Name	Year	Type of Work	AFRO Number (Report of Work Number)*
Blackbear Lake Area	Rubicon Minerals Corporation (Norseman Property)	2000-2001	GM, HLEM, Lc	2.20916 (24-2001)
Blackbear Lake Area	Rubicon Minerals Corporation (Norseman Property)	2001	DDH(1)=209.01M, Assays	2.20959 (34-2001)
Blackbear Lake Area	Rubicon Minerals Corporation (RLXW Property)	2001	GM, Lc	2.20909 (22-2001)
Blackbear Lake Area	Rubicon Minerals Corporation (RLXW Property)	2001	GM, HLEM	2.20933 (29-2001)
Casummit Lake Area	First Au Strategies Corp. (Argosy Mine Property)	1999	GL	Non-Assessment
Casummit Lake Area	Jonpol Explorations Ltd./Wolfden Resources Inc. (Birch Lake Property)	2000	DDH(2)=490.5M, Assays	2.20879 (1-2001)
Casummit Lake Area	Jonpol Explorations Ltd./Wolfden Resources Inc. (Birch Lake Property)	2001	Lc, GM, Assays, DDH(5)=853M	2.20988 (42-2001)
Dome Township	Cypress Development Corp. (McKenzie Island Property)	2001	GM, Samp, Assays	2.21791 (30467-2001)
Dome Township	Goldcorp Inc. (Marboy Property)	2001	DDH(2)=994M, Assays	2.21603 (308-2001)
Dome Township	Rubicon Minerals Corporation (Dorion Island)	2001	Str	2.21080 (52-2001)
Dome, Fairlie, and Todd Townships	Rubicon Minerals Corporation (Dorion-McCuaig Corridor and Humlin Properties)	2001	AM	2.20925 (19-2001)
Dome, Heyson Townships	Peterson, C. (Skookum Bay Property)	1999	Str, Tr, Samp, Pr, GL, sample descriptions	OP99-155
Fairlie Township	Meunier, David (St. Pauls Bay Property)	2001	VLF-EM, GM	2.20919 (23-2001)
Fredart Lake Area	Tribute Minerals Corporation (Fredart Lake Property)	2001	GL, GC (MMI and Enzyme Leach)	2.21480 (194-2001)

Township or Area	Company Name	Year	Type of Work	AFRO Number (Report of Work Number)*
Heyson Township	English, P.	1999	Pr, Samp, Lc, GM, Assays	2.20617 (78-2000) Same as OP99-454
Heyson Township	Gangloff, R.	1999	Pr, Lc, GM, Samp, Assays	OP99-453
McDonough Township	Rubicon Minerals Corporation (Slate Bay Property)	2000	GM, IP	2.20835 (3-2001)
McDonough Township	Rubicon Minerals Corporation (Slate Bay Property)	2000-2001	GM, IP, RES	2.21078 (51-2001)
Mitchell Township	Nuinsco Resources Limited (Mitchell Property)	2000	PEM, Assays, DDH(2)=983.2M	2.20924 (30-2001)
Mulcahy Township and Medicine Stone Lake Area	Rubicon Minerals Corporation (Killala South Block Property)	2001	3D Gradient AMAG	2.22340 (31013-2001)
Pakeagama Lake Area	Emerald Fields Resource Corporation (Pakeagama Lake Property)	2000	GL, Pr	2.20904 (25-2001)
Pakeagama Lake Area	Houston Lake Mining Inc. (Pakeagama Lake Property)	2001	Assays	2.20995 (45-2001)
Pakeagama Lake Area	Houston Lake Mining Inc. (Pakeagama Lake Property)	2001	Lc, GM, VLF-EM	2.21840 (509-2001)
Ranger Township	Ansil Resources Ltd. (Ranger Property)	2000	MMI, Soil Samp, Assays	2.21082 (56-2001)
Root Lake Area	Watts, H.A.	1998	Pr, Str, Tr, Samp, Assays	2.20572 (68-2000)
South of Otter Lake Area	Twomey, T.J.	1999	GL, GC (Enzyme Leach and MMI)	OP9-335
Todd Township (Hammell Lake Area)	Goldcorp Inc. (Rowan Property)	2000-2001	AEM, AMAG, VLF-EM, Radiometric	2.21592 (298-2001)
Todd Township (Hammell Lake Area)	Goldcorp Inc. (Rowan Property)	2001	DDH(8)=1974M, Assays	2.21962 (614-2001)

**Corresponds to Resident Geologist Office file designation*

Programs with significant exploration expenditures and/or significant known results, and properties whose location is of particular strategic or geologic interest are described below. Information included in this section is taken from assessment files in the Red Lake Resident Geologist's office, unless otherwise indicated. Programs are keyed with numbers in parentheses to Table 5 and Figures 1, 2, 3 and 4.

Red Lake Greenstone Belt

GOLDCORP INC.

Significant exploration programs were undertaken on most of the company's extensive landholdings in the Red Lake camp. Diamond drilling (totalling approximately 46 000 m), MMI sampling (approximately 13 000 samples), channel sampling and geological mapping were performed on some or all of the following properties: Brewis, Chevron, Forsyth, Gullrock/Chukuni, Marboy, Marcus, Martin Bay/Rowan, Parvus, Redcon, Trout/Middle/Pipestone Bay and Slate Bay. In addition, approximately 1000 line-km of airborne geophysics were flown over selected properties and over the Red Lake Mine area. Initial focus of surface exploration was to target potential shallow (<300 m) mineralization near the past producing Cochenour Mine (see Table 3), the fourth largest (1.24 million ounces gold) and second richest (0.54 opt) in the Red Lake area. Goldcorp, drilling on the Chevron and Abino zones, intersected significant mineralization, e.g., 18.11 opt Au over 4.9 feet (620.9 g/t gold over 0.77 m) in the Abino zone; 0.46 opt Au over 23.0 feet (15.7 g/t gold over 7.0 m) in the Chevron zone; and 1.45 opt Au over 3.3 feet (49.8 g/t gold over 1.0 m) in the Marcus area.

PLACER DOME (CLA) LTD.

Phase I and II of Placer Dome's ongoing exploration program on the Madsen Mine option, 10 km southwest of Red Lake, were completed this year. A minimum of $1.2 million has now been spent by Placer Dome on the property. A drill program was designed to intersect the historic high-grade No.8 Zone half way between surface and the known No.8 Zone underground workings. Phase I entailed four holes (totalling 3431 m) and Phase II drilling involved two pilot holes, with one wedged navigational cut from each hole, totalling 4432 m. Four separate mineralized structures were intersected. Three of four zones returned grades in the 4 to 5 g/t gold over 1 to 3 m range. Concurrent with the drilling program, Placer Dome carried out geological mapping, prospecting, and soil geochemical and MMI surveying along 10 km of prospective mafic-ultramafic stratigraphy, northeast of the Madsen workings.

RUBICON MINERALS CORPORATION

Rubicon holds approximately 300 square kilometres of mining land in the Red Lake area, a significant portion of which is within the Red Lake Joint Venture with AngloGold (Canada) Explorations Inc. (*see* "Rubicon Minerals Corporation-AngloGold (Canada) Explorations Inc."). A 6-hole, 1825 m diamond drilling program was completed on the McCuaig joint venture project, in Dome and Fairlie Townships, with partner Golden Tag Resources Ltd. With these expenditures Rubicon becomes vested at 50% in the project and has taken over as operator. Assays of 13.11 g/t gold over 0.30 m and 7.45 g/t gold over 0.25 m in drill hole MC-01-02 were followed-up with 4 other holes, 3 of which encountered sections of strongly anomalous gold and associated arsenic and antimony.

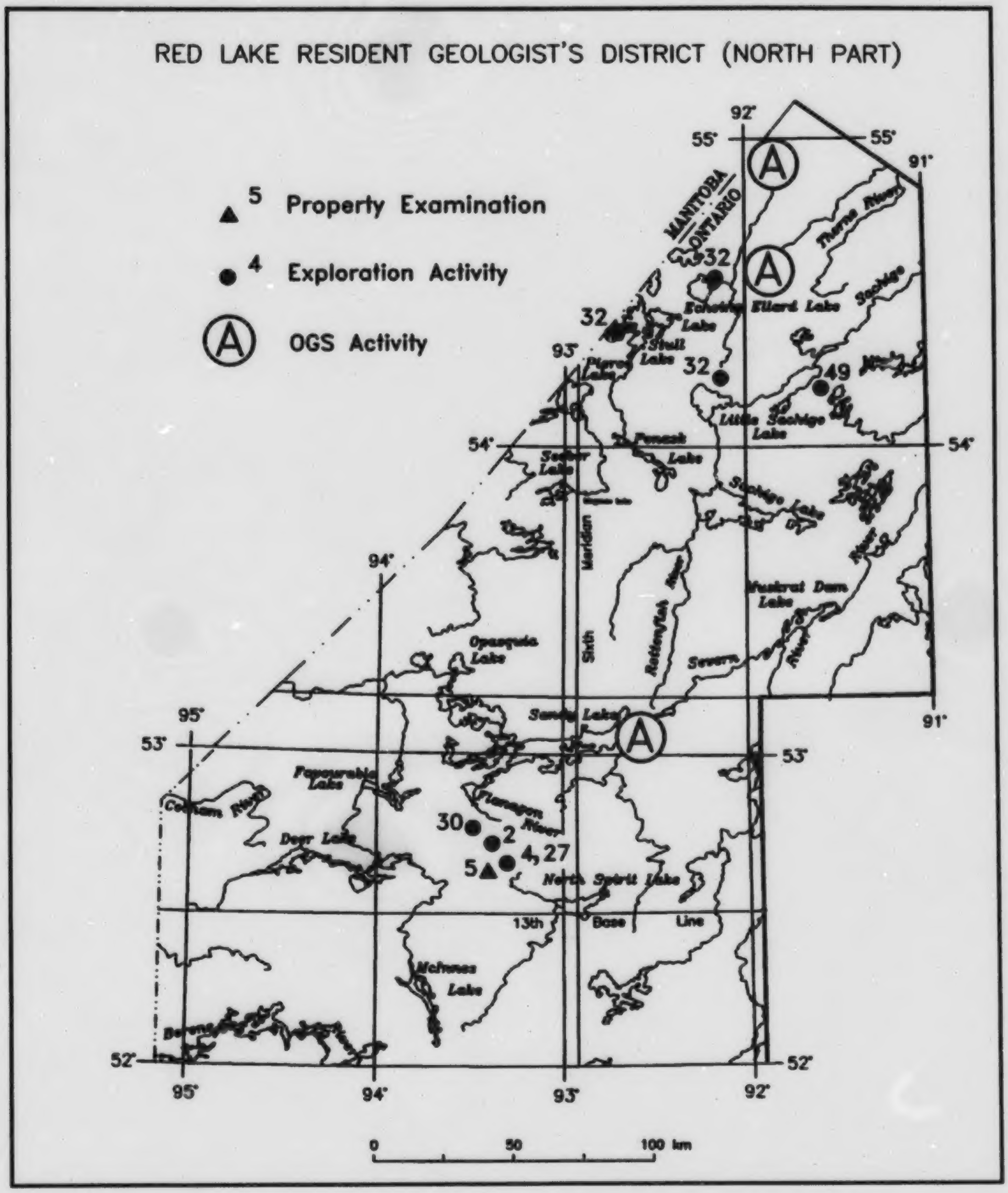
RED LAKE RESIDENT GEOLOGIST'S DISTRICT (NORTH PART)
▲ 5 Property Examination
● 4 Exploration Activity
Ⓐ OGS Activity
MANITOBA
ONTARIO
Echoing Lake
Ellard Lake
Stull Lake
Pierce Lake
Little Sachigo Lake
Pennock Lake
Sachigo Lake
Severn Lake
Sachigo
Sixth Meridian
Rottenfish River
Muskrat Dam Lake
Opasquia Lake
Severn
Sandy Lake
Favourable Lake
Cobham River
Deer Lake
Nattawagan River
North Spirit Lake
13th Base Line
McInnes Lake
Berens River
32
32
32
49
30
2
4, 27
5
55°
54°
53°
52°
95°
94°
93°
92°
91°
0
50
100 km

Figure 1. Red Lake District (north part): exploration, OGS activity and property examinations.

Table 5. Exploration activity in the Red Lake Resident Geologist District in 2001.

Abbreviations

AEM	Airborne electromagnetic survey
AM	Airborne magnetic survey
ARA	Airborne radiometric survey
Beep	Beep Mat survey
Bulk	Bulk sampling
DD	Diamond drilling
DDH	Diamond drill hole(s)
DGP	Down-hole geophysics
GC	Geochemical survey
GEM	Ground electromagnetic survey
GL	Geological Survey
GM	Ground magnetic survey
GRA	Ground radiometric survey
Grav	Gravity survey
HLEM	Horizontal loop electromagnetic survey
HM	Heavy mineral sampling
IM	Industrial mineral testing and marketing
IP	Induced polarization survey
Lc	Linecutting
MMI	Mobile Metal Ion soil sampling survey
OD	Overburden drilling
ODH	Overburden drill hole(s)
PEM	Pulse electromagnetic survey
PGM	Platinum group metals
Pr	Prospecting
RES	Resistivity survey
Samp	Sampling (other than bulk)
Seismic	Seismic survey
SP	Self-potential survey
Str	Stripping
Tr	Trenching
UG	Underground exploration/development
VLEM	Vertical loop electromagnetic survey
VLFEM	Very low frequency electromagnetic survey

No	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
1	Ansil Resources Ltd. (Baird, Ranger, and Willans Properties)	Baird, Ranger, and Willans Townships (Au)	GL, MMI
2	Consolidated Westview Resource Corp. (Pakeagama Lake Property)	Pakeagama Lake Area (Rare Metals)	Staking
3	Cypress Development Corp. (McKenzie Island Property)	Dome Township (Au)	GM, Samp, Assays (2.21791, 30467-2001)
4	Emerald Field Resource Corp. (Pakeagama Lake Property)	Pakeagama Lake Area (Rare Metals)	Staking
5	First Au Strategies Corp. (Leg Lake Property)	Birkett and Earngey Townships (PGM, Ni, Cu, Co, Pt)	Staking
6	First Au Strategies Corp. (Casummit Lake Property)	Casummit Lake Area (Au)	Staking
7	Fronteer Development Group Inc./Glenhaven Ventures Inc. (Grace Lake Property)	Satterly Lake Area and McNaughton Township (Cu, Zn)	GL, Pr
8	Fronteer Development Group Inc./Glenhaven Ventures Inc. (Mink Lake Property)	Casummit Lake Area (Au, Ag, Cu, Pb, Bi, As)	GL, Pr, GC, Samp, Assays
9	Fronteer Development Group Inc./Glenhaven Ventures Inc. (Swain East Property)	Shabumeni Lake Area (Au, Ag, Cu, Zn)	GL, Pr, GC, Samp, Assays
10	Fronteer Development Group Inc./Talus Ventures Corp. (Sandy Point Property)	Keigat Lake Area (Au, Ag, Cu, Bi)	GL, Pr, GC, Samp, Assays

No	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
11	Fronteer Development Group Inc./Talus Ventures Corp. (Shanty Bay Property)	Dent Township (Au, Ag, Cu, Pb, Zn, As)	GL, Pr, Samp, Assays
12	Gold Canyon Resources Inc./ ECI Minerals Ltd. (Springpole Project)	Casummit Lake Area (Diamond)	Evaluation of existing drill core
13	Goldcorp Inc. (Abino Property)	Dome Township (Au)	DD, GL, DGP, Str, Samp, AM, AEM, MMI
14	Goldcorp Inc. (Brewis Property)	Dome Township (Au)	DD, MMI
15	Goldcorp Inc. (Chevron Property)	Dome Township (Au)	DD, Samp, Assays, AEM, AM, MMI
16	Goldcorp Inc. (Forsyth Property)	Bateman Township (Au)	DD, MMI
17	Goldcorp Inc. (Gullrock/Chukuni Property)	Willans Township (Au)	DD, DGP, AEM, AM, Lc, MMI
18	Goldcorp Inc. (Marboy Property)	Dome Township (Au, Pt, Pd, Rh, Cu, Ni)	DDH(2)=994M, Assays (2.21603, 308-2001) DGP, AEM, AM, MMI
19	Goldcorp Inc. (Marcus Property)	Dome Township (Au)	MMI, DD, AEM, AM, GL, Str, Samp
20	Goldcorp Inc. (Martin Bay/Rowan Property)	Todd Township (Au)	DDH(8)=1974M, Assays (2.21962, 614-2001) AEM, AMAG, VLF-EM, Radiometric (2.21592, 298-2001) MMI
21	Goldcorp Inc. (Parvus Property)	Dome Township (Au)	Lc, MMI
22	Goldcorp Inc. (Redcon Property)	Balmer Township (Au)	Lc, MMI
23	Goldcorp Inc. (Red Lake Mine property)	Dome Township (Au)	AEM, AM
24	Goldcorp Inc. (Slate Bay Property)	McDonough Township (PGE)	DD
25	Goldcorp Inc. (Trout, Middle & Pipestone Bay Properties)	Mulcahy and Ball Townships (Au, Pt, Pd, Ni, Cu)	GL, Samp
26	Goldcorp Inc./Tri Origin Exploration Ltd. (Confederation Property)	Gerry Lake Area (Au, Ag, Zn, Ni, Cu, Co)	Lc, MMI, DDH(1)=450M, Staking, Assays
27	Houston Lake Mining Inc. (Pakeagama Lake Rare Metals Property)	Pakeagama Lake Area (Rare Metals)	Assays (2.20995, 45-2001) Lc, GM, VLF-EM (2.21840, 509-2001) Str, Samp, GL, GM, VLF-EM, Assays, Pr , Lithogeochem
28	Jonpol Explorations Ltd./ Wolfden Resources Inc. (Birch Lake Intrusive Property)	Casummit Lake Area (Au, Pt, Pd, Cu, Ni)	Lc, GM, Assays, DDH(5)=853M (2.20988, 42-2001)

No	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
29	Kafka Granite LLC (Corless Quartz Property)	Little Bear Lake Area & Knott Township (Dimensional Stone)	Str, Tr, Samp, IM, Bulk
30	Kermode Resources Ltd. (Pakeagama Lake West Property)	Pakeagama Lake Area (Rare Metals)	Staking
31	Meunier, David (St. Pauls Bay Property)	Fairlie Township (Au)	VLF-EM, GM (2.20919, 23-2001), (2.20987, 43-2001)
32	Northway Explorations Ltd. /Jonpol Explorations Ltd. /Wolfden Resources Inc. (Stull Lake Diamond Property)	Bonnell and Warnock Lake areas, and Richardson Arm (Stull Lake) Area (Diamonds)	Lc, GM, DD
33	Placer Dome (CLA) Ltd./Claude Resources Inc. (Madsen Mine Property)	Baird Township (Au)	Phase I - DDH(4)=3431M Phase II - DDH(4)=4432M, Assays, GL, Pr, GC, Samp, MMI
34	Placer Dome (CLA) Ltd. (East Bay Property)	Bateman Township (Au, Pt, Pd)	DDH(2)=1908', Samp, GC (2.21053, 53-2001)
35	Placer Dome (CLA) Ltd. (Hoyles Bay Property)	Bateman Township (Au)	DDH(2)=607M, Samp, GC (2.21056, 55-2001)
36	Placer Dome (CLA) Ltd. (North Loner Claim Property)	Bateman Township (Au)	Str (2.21054, 54-2001)
37	Rubicon Minerals Corporation (Dorion Island)	Dome Township (Au)	Str (2.21080, 52-2001)
38	Rubicon Minerals Corporation (Dorion-McCuaig Corridor Property)	Dome and Fairlie Townships (Au)	AM (2.20925, 19- 2001)
39	Rubicon Minerals Corporation (Killala South Block Property)	Mulcahy Township (Au)	AMAG (3D-Gradient) (2.22340, 31013-2001)
40	Rubicon Minerals Corporation (North Pipestone Property)	Ball Township (Au, Ni, Cu, Zn)	Str, Samp, Assays (2.22085, 30726-2001)
41	Rubicon Minerals Corporation (South Pipestone Bay Property)	Ball Township (Ni, Cu, Zn)	Str, Tr, Samp, Assays (2.21606, 30311-2001)
42	Rubicon Minerals Corporation (Wolf Bay Block)	Fairlie, Killala and Todd Townships (Au)	AMAG (3D-Gradient) (2.22408, 31074-2001)
43	Rubicon Minerals Corporation /AngloGold (Canada) Exploration Company (Norseman Property)	Blackbear Lake Area (Au)	HLEM, GM, Lc (2.20916, 24-2001) DDH(1)=209.01M (2.20959, 34-2001)
44	Rubicon Minerals Corporation /AngloGold (Canada) Exploration Company (Slate Bay Property)	McDonough Township (Au)	IP, GM, RES (2.21078, 51-2001) DDH(6)=1672M, Assays (2.22391, 31059-2001) Samp, Assays, AMAG (3D-Gradient)
45	Rubicon Minerals Corporation/Golden Tag Resources (McCuaig Gold Project)	Dome Township (Au)	DDH(6)=1825M, Assays
46	Skyharbour Developments Ltd. (Dent Property)	Dent Township (Au)	Pr, Samp, Assays
47	Tribute Minerals Corporation (Fredart Lake Property)	Fredart Lake Area (BM, Au, Ag)	GL, GC (MMI and Enzyme Leach) (2.21480, 194-2001)

No	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
48	Tribute Minerals Corporation (Richardson Lake Property)	Casummit Lake Area (Au)	AMAG, AEM (2.22193, 30820-2001)
49	Wallbridge Mining Co. Ltd. (Blackbear Lake Property)	Namaypoke and Winters Lake areas (Ni, Cu, PGM)	Staking

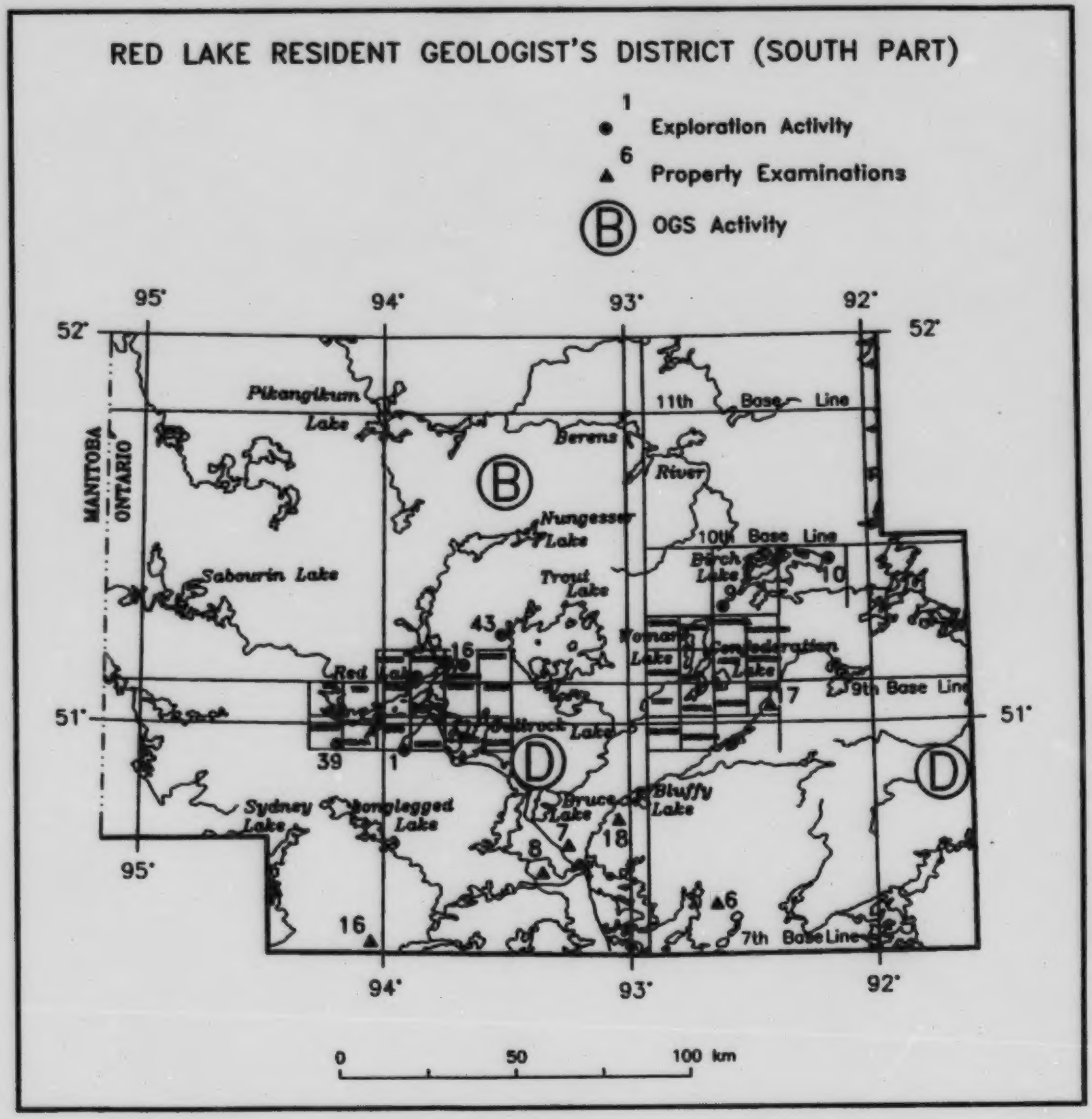
RED LAKE RESIDENT GEOLOGIST'S DISTRICT (SOUTH PART)
1 ● Exploration Activity
6 ▲ Property Examinations
B OGS Activity
95°
94°
93°
92°
52°
51°
MANITOBA
ONTARIO
Pikangikum Lake
Berens River
11th Base Line
10th Base Line
9th Base Line
7th Base Line
B
Nungesser Lake
Trout Lake
Birch Lake
Sabourin Lake
Woman Lake
Confederation Lake
Red Lake
Bulldrock Lake
D
D
Sydney Lake
Longlegged Lake
Bruce Lake
Bluffy Lake
43
16
9
10
7
39
1
7
8
18
6
16
0
50
100 km

Figure 2. Red Lake District (south part): exploration, OGS activity and property examinations.

RUBICON MINERALS CORPORATION – ANGLOGOLD (CANADA) EXPLORATIONS INC.

The Rubicon–AngloGold joint venture ('RLJV') is in the second year of a five-year term; AngloGold must contribute US$3 million to earn a 60% interest in the landholdings (approximately 210 square kilometres) in the Red Lake area. The joint venture partners completed a 6-hole, 1662 m diamond drilling program on the Slate Bay property. Five of the holes tested previously reported surface mineralization comprising 3.44 g/t gold over 21.85 m of chip sampling in sulphide-bearing sedimentary rocks. Broad zones of gold mineralization associated with pyrite-chalcopyrite ± magnetite mineralization and intense biotite and chlorite ± tourmaline alteration, were encountered in the 5 holes drilled along a 100 m strike length under the surface occurrence. In particular, within mafic volcanics, hole SB01-01 encountered 1.19 g/t gold over 15.59 m and SB01-04 returned 2.56 g/t gold over 2.3 m, including 5.65 g/t gold over 0.75 m. Within sedimentary rocks, SB01-03 assayed 1.25 g/t gold over 5.7 m, including 7.65 g/t gold over 0.34 m. The structural and lithological features of the gold mineralization, coupled with the intense zones of alteration, leads the companies to conclude that the geological setting is similar to the major producing gold mines in the Red Lake Camp.

Detailed helicopter-borne 3D-Gradient magnetic surveys were completed by Fugro Airborne Surveys over the Slate Bay area of the RLJV and 2200 line-km over other 100% Rubicon-held ground in the Red Lake Camp. Follow-up drilling in the Slate Bay area is expected in early 2002.

Birch–Uchi–Confederation Belt

FRONTEER DEVELOPMENT GROUP INC.

The company staked 10 claim blocks, consisting of 396 units, in the Keigat and Casummit Lake area in the Birch–Uchi greenstone belt and optioned the Woman Lake property, situated in the southwest corner of Dent Township. Fronteer believes that key stratigraphic, structural and metallogenic characteristics of the area are identical to those of the world-class Red Lake gold camp immediately to the west.

Phase 1 exploration work entailed geological mapping, prospecting and sampling. Results from 2 of the properties included:

- **Sandy Point:** 12.56 g/t gold over 1.7 m chip sample and up to 13.82 g/t gold in selected grab sample from silicified and pyritized axial zone of tightly folded iron formation
- **Shanty Bay:** 11.43 g/t gold over 1.2 m chip sample and 9.95 g/t gold selected grab sample in intensely silicified and pyritized, carbonatized shear zone adjacent to a syenite dike.

FRONTEER DEVELOPMENT GROUP INC. – GLENHAVEN VENTURES INC.

Glenhaven entered into an option agreement with Fronteer Development Group covering five separate claim groups (the "Birch Lake property"). To earn a 50% interest in the property, exploration expenditures totalling $750 000 and $60 000 in cash payments must be made within three years of signing a formal agreement, in addition to issuing to Fronteer 200 000 shares of Glenhaven.

Preliminary results from 2 of the claim blocks within the Birch Lake property include:

- **Swain East:** VMS style copper-gold mineralization up to 3.90% Cu, 0.90 g/t gold, 7.00 g/t silver, and 1.69% Cu, 9.23 g/t gold, 41.2 g/t Ag in grab samples
- **Mink Lake:** grab sample up to 35.59 g/t gold in quartz-carbonate vein system in 20 m wide corridor approximately 2.8 km long.

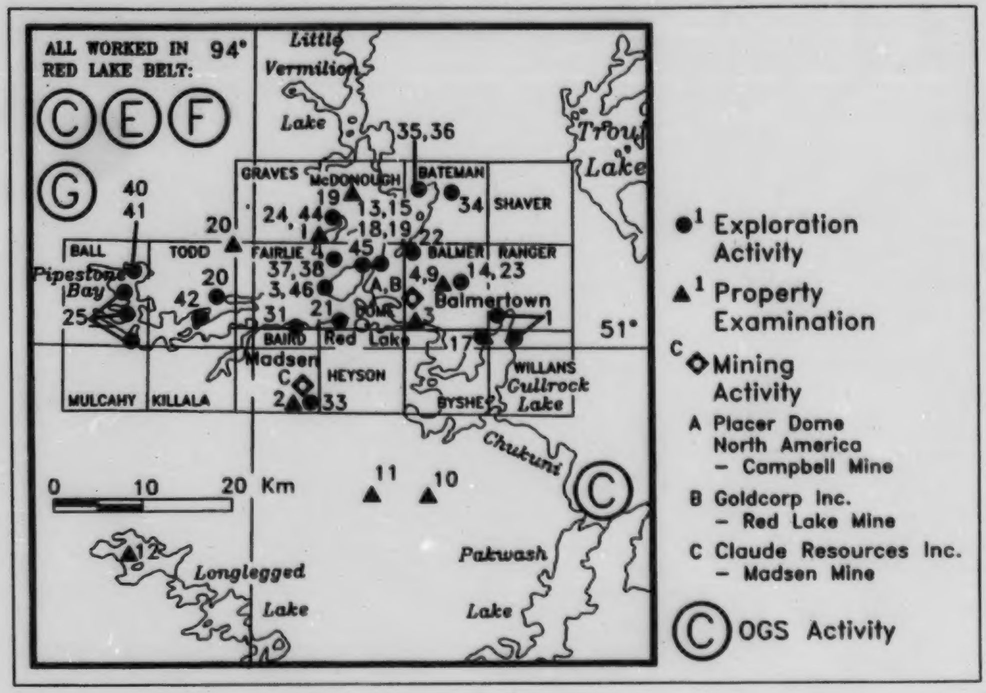
ALL WORKED IN RED LAKE BELT:
Ⓒ Ⓔ Ⓕ Ⓖ
94°
Little Vermilion Lake
Trout Lake
35,36
GRAVES
McDONOUGH
BATEMAN
SHAVER
19
13,15
34
24, 44
18,19
22
1
40
41
20
BALL
TODD
FAIRLIE
45
BALMER
RANGER
37,38
Pipestone Bay
20
3,46
4,9
14,23
A,B
Balmertown
42
25
31
21
DOME
3
17
1
BAIRD
Red Lake
51°
Madsen
C
HEYSON
WILLANS
Cullrock Lake
MULCAHY
KILLALA
2
33
BYSHE
Chukuni
0 10 20 Km
11
10
Ⓒ
12
Longlegged Lake
Pakwash Lake
●¹ Exploration Activity
▲¹ Property Examination
ᶜ◇ Mining Activity
A Placer Dome North America – Campbell Mine
B Goldcorp Inc. – Red Lake Mine
C Claude Resources Inc. – Madsen Mine
Ⓒ OGS Activity

Figure 3. Red Lake greenstone belt: mining, exploration, OGS activity and property examinations.

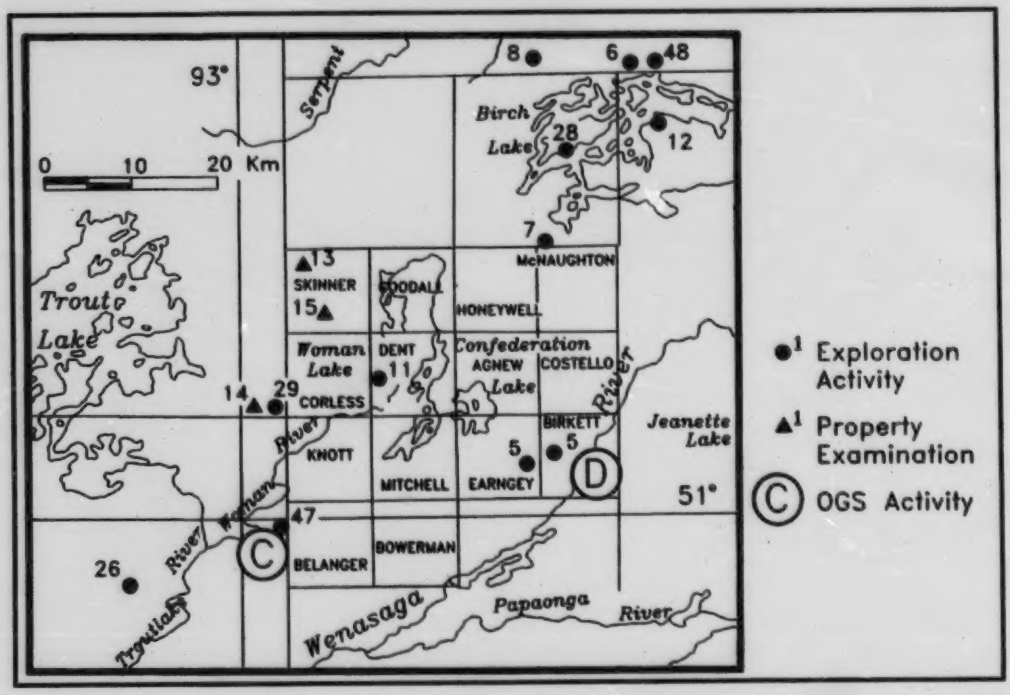
93°
Serpent
8
6
48
Birch Lake
28
12
0 10 20 Km
7
McNAUGHTON
13
SKINNER
15
GOODALL
HONEYWELL
Trout Lake
Woman Lake
DENT
11
Confederation
AGNEW
COSTELLO
Lake
River
14
29
CORLESS
River
BIRKETT
Jeanette Lake
KNOTT
5
5
MITCHELL
EARNGEY
Ⓓ
51°
Woman
47
Ⓒ
BELANGER
BOWERMAN
26
River
Troutlake
Wenasaga
Papaonga River
●¹ Exploration Activity
▲¹ Property Examination
Ⓒ OGS Activity

Figure 4. Birch–Uchi–Confederation greenstone belt: exploration, OGS activity and property examinations.

FIRST AU STRATEGIES CORP.

The company acquired an option to earn a 51% interest in the Casummit Lake property of Wolfden Resources Inc. The property incorporates the past producing Argosy Mine, which operated intermittently between 1934 and 1952, milling 277 000 tons of ore grading 12.62 g/t gold (0.368 opt Au). All three mined zones are open below the 270 m level. The agreement provides that First Au Strategies will make cash payments totalling $40 000, issue 200 000 shares and undertake $650 000 of exploration expenditures over a two-year period.

Three claims consisting of 35 units in Earngey Tp. and hosting the Colberg nickel-copper-cobalt-platinum occurrence were acquired at year end. The company had already staked an additional 186 claim units adjacent and contiguous to the property, covering portions of Uchi and Leg lakes. The area hosts an extensive mafic intrusion, the nickel-copper-platinum group element potential of which has only been cursorily tested.

KAFKA GRANITE LLC

Significant development work occurred on the Corless Quartz property in the Little Bear Lake area and Knot Township. Approximately 600 tonnes of quartz were trucked 160 km to the Red Lake Road CN railroad terminal, from where it was shipped to various buyers. Another 600 tonnes is ready for shipment and remains on site. Approximately $100 000 was spent in delineating a probable 100 000 tonne resource that consists of high purity quartz, with potential use in the decorative stone, precast concrete and tile industry.

North of 51°

WOLFDEN RESOURCES INC. – JONPOL EXPLORATIONS LTD. – NORTHWAY EXPLORATIONS LTD.

Northway Explorations Ltd. entered into an option agreement with partners Wolfden Resources Inc. and Jonpol Explorations Ltd. to earn a 50% interest in the 17 separate claims staked in the Ponask River and Stull Lake areas. Kimberlite indicator minerals were discovered in a broad area encompassing the claims, during initial wide-scale sampling of alluvium by the OGS (Stone 2001). Linecutting and detailed ground geophysical surveys were performed over selected target areas. Four preliminary drill holes tested second priority targets and intersected gabbroic, non-kimberlitic rocks.

HOUSTON LAKE MINING INC.

Significant results from the Pakeagama Lake rare metals property were obtained from a summer exploration program. The company completed 25.4 km of line-cutting and geophysical (magnetic and VLF-EM) surveys, geological mapping, stripping and channel sampling programs. The known dimensions of the pegmatite have been increased to over 280 m of strike length, with both directions open, and from 25 to 35 m true width. Systematic sampling of the Northern Wall Zone confirms significant tenors of high-tech metals in 2 series of channel cuts spaced 15 m apart:

Sample Interval	Li_2O %	Rb_2O %	Cs_2O g/t	Ta_2O_5 g/t	BeO g/t	Nb_2O_5 g/t	Ga g/t	Ge g/t	Tl g/t	Sn g/t
First cut:										
11.0 m	1.21	0.53	958	222	1259	107.0	56	8.1	35.8	120
Incl. 8.0 m	1.16	0.52	929	249	1198	121.0	56	8.0	34.2	117

Second cut:										
7.0 m	0.78	0.90	934	233	329	53.1	44	7.9	69.5	108
Incl. 4.0 m	0.66	0.92	969	311	368	121.0	45	7.5	71.6	133

The company is also attempting to define the source of a lithium-cesium anomaly in granites south of the main Pakeagama pegmatite. A strong possibility exists that the source of these elements is from a blind (buried) rare metals pegmatite below existing granite outcrops. Assay values ranged from 11 to 1078 ppm cesium in 18 samples taken from a grid sampling program performed this summer. Published background values for the abundance of cesium in granite are 5 ppm. Using a 125 ppm threshold, the known cesium anomaly is over 150 m long, and open to the northwest and south.

RESIDENT GEOLOGIST STAFF AND ACTIVITIES

At year-end, staff of the Red Lake Resident Geologist's office comprised Andreas Lichtblau, Resident Geologist, Carmen Storey, District Geologist, and Lynn Kosloski, District Support Geologist. Shawn Hiller was for a short time employed as field and office assistant in the Summer Experience Program.

C. Storey, through the Red Lake CIM Branch, helped organise a "Workshop on the Geology of the Red Lake Greenstone Belt and Western Superior NATMAP" which featured presentations by GSC and OGS geologists. The CIM Red Lake Exploration Roundup, was held at the same venue. The NATMAP workshop consisted of talks and poster displays with hands-on demonstrations of the Red Lake GIS Project by Doug Panagapko. A. Lichtblau and C. Storey gave talks on the Red Lake District and showed the poster display from the 2001 NWOPA Symposium. The NATMAP workshop had approximately 50 attendees and the CIM Exploration Roundup, a similar number.

DRILL CORE STORAGE SITE

In the year 2001, there were 14 users of the Red Lake remote drill core storage site. Diamond drill core from the Red Lake Gold Shore Mine property was donated by Barrick Gold Corporation and added to the collection, totalling approximately 350 feet.

PROPERTY EXAMINATIONS

Table 6. Property visits conducted by the Red Lake Regional Resident Geologist and Staff in 2001.

Number (keyed to Figures 1-4)	Property/Occurrence
1	Goldcorp Inc., Slate Bay Core Shack, McDonough Township
2	Placer Dome (CLA) Ltd./Claude Resources Inc., Madsen Core Shack, Baird Township
3	Campbell Core Shack, Balmer Township
4	O'Keefe Lake, Balmer Township
5	Pakeagama Lake, Pakeagama Lake Area
6	McKenzie Bay Granite, Maskerine Lake Area
7	Sandy Creek Beryl, Camping Lake Area
8	Windfall Road Pegmatites, Gould Lake Area
9	Peterson Property, Balmer Township

Number (keyed to Figures 1-4)	Property/Occurrence
10	P. English Showing, Dixie Lake Area
11	Dixie Lake Road PGE Reconnaissance, Dixie and Dedee Lake areas
12	Longlegged Lake PGE Reconnaissance, Confusion Lake Area
13	Bathurst Mine, Skinner Township
14	Corless Road Quartz Vein, Little Bear Lake Area
15	Dunkin, Skinner Township
16	Conifer Lake, Sumach Lake Area
17	Wenasaga Road Pegmatite Reconnaissance, Birkett Township
18	Cramp Lake Pegmatite, Ear Falls Area
19	Pure Gold Gabbro, McDonough Township
20	Hammell Lake Anorthosite, Todd Township
	Dryden Cemetery Pegmatite, Van Horne Township (Kenora District)
	Dryden East Pegmatite, Van Horne Township (Kenora District)
	Canmine Resources Corporation, Werner Lake Area (Kenora District)

Dunkin Occurrence - C. Storey

The Dunkin Shaft is located on a peninsula that extends eastward into the northwestern part of Narrow Lake (Figures 5 to 7). Greig (1928), Bruce (1929), and Pryslak (1986) have mapped the bedrock geology. Greig (1928) and Bruce (1929) described the deposit, the exploration history was summarised by Parker and Atkinson (1992).

The following history summary was compiled from Parker and Atkinson (1992). In June 1926 Thomas Dunkin made a gold discovery on Narrow Lake, and carried out surface prospecting on a block of 13 claims that encompass what is now known as the Dunkin gold occurrence. In 1927 Dunkin Gold Mines Ltd. began sinking a three-compartment shaft which ultimately reached a depth of 83 m in 1929 with levels at 38 and 76 m. The property was closed at the end of 1929 and received only sporadic exploration attention until 1974, when B. Vihonen and J. S. Waldie staked 33 claims over the Dunkin shaft and associated gold showings. Northmark Gold Mines Ltd. conducted prospecting, stripping, trenching, ground geophysical surveys and diamond drilling (9 holes for a total of 243.0 m). The property changed hands several more times, and in 1987, Canadian Patricia Exploration Ltd. acquired 36 claims east of the Dunkin Shaft while Golden Hat Resources Inc. acquired 6 claims that included the shaft and the No.2 and 2a gold showings. Both companies carried out surface exploration and diamond drilling.

The Dunkin occurrence is hosted in rocks of the Woman assemblage (Rogers et al. 1999). In the vicinity of the Dunkin occurrence, the Woman assemblage rocks are composed of pillowed and massive mafic metavolcanics intruded by numerous gabbro sills. The Dunkin shaft was sunk in one of these sills. Fyon and Lane (1986) and Fyon and O'Donnell (1986) indicate this area as part of the Narrow Lake deformation zone characterised by east- to southeast-trending chloritic shear zones resulting from the D_2 deformation event. The rocks are variably altered and sheared but the most intense alteration is restricted to the shear zones; the intervening rocks appear (from visual examination) to have only a low level of chloritization. Large white quartz veins are common in these shear zones; a number of these veins have been named during previous exploration activities, as shown in Figure 7. Greig (1928) describes both the white, weakly sulphidic veins and blue-grey, vuggy, sulphide-bearing veins accompanied by visible gold. Large amounts of white- to grey-coloured quartz was seen but definite blue-grey, vuggy quartz was not seen during the 2001 examination. A set of grey quartz veins, distinct from the white quartz veins, is described from the Road A area west of the Dunkin Shaft (see below). Previous exploration on the Dunkin veins has returned erratic but often high gold values. Parker and Atkinson (1992) report 0.405 ounces of gold per ton and 0.42 ounces of silver per ton from a grab sample of quartz at the shaft. High gold and silver assays are often accompanied by high copper values, in a few cases over 2% Cu. Some of the high gold and silver assays are reproduced in Table 7.

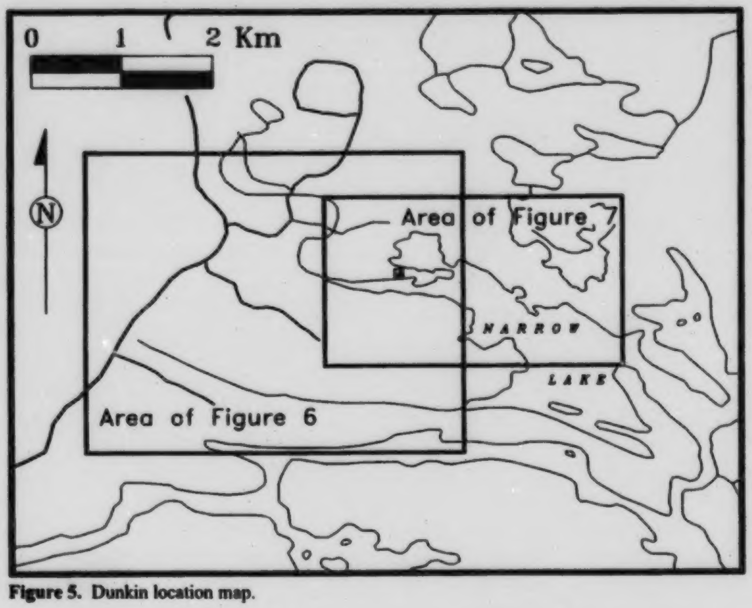

Figure 5. Dunkin location map.

Table 7. Reported high gold and silver assays (in ounces per ton)

Au	Ag	Source
0.20		Russell and Hood (1988) sample DUNK 1
0.28		Russell and Hood (1988) sample DUNK 2
0.41		Russell and Hood (1988) sample DUNK 3
0.28		Russell and Hood (1988) sample DUNK 5
1.64		Russell and Hood (1988) sample DUNK 6
0.56	0.28	Valliant (1974) quartz vein chip sample C#1 Dunkin #2
0.15	1.27	Valliant (1974) quartz vein chip sample C14Dunkin #2
0.74	0.08	Valliant (1974) white quartz vein sample A1 Dunkin #3
0.70	0.06	Valliant (1974) white quartz vein sample A4 Dunkin #3
2.33	1.3	Willy(1987) sample 1401
0.67	0.4	Willy (1987) sample 1402
0.72	1.14	Willy (1987) sample 719
3.96	1.22	Willy (1987) sample 726
0.44	0.52	Willy (1987) sample 727

The shaft area was examined in September 2001. The pits and trenches are largely overgrown but vein and wall rock can be seen in situ in the main trench as shown on Figure 7. The dominant mineralization visible consists of a large milky white to light grey quartz vein with minor amounts of sulphide minerals. The gabbroic host rock is medium to coarse grained, dark green to dark grey in colour. The rock is massive except where affected by shear zones. The gabbro contains disseminated pyrite and pyrrhotite, in both the areas affected by shearing, and in the massive relatively undeformed areas. Similar material is described in diamond drill logs by Russell and Hood (1988). The mafic metavolcanic rocks are dark green and fine grained. Table 8 contains the results of sampling the vein and host rock plus material from the dump. The highest gold assays are from samples of quartz vein material. Sample 2001CS044, from the dump, contains elevated amounts of platinum, palladium and copper. This sample is a coarse-grained gabbro with disseminated pyrite and pyrrhotite.

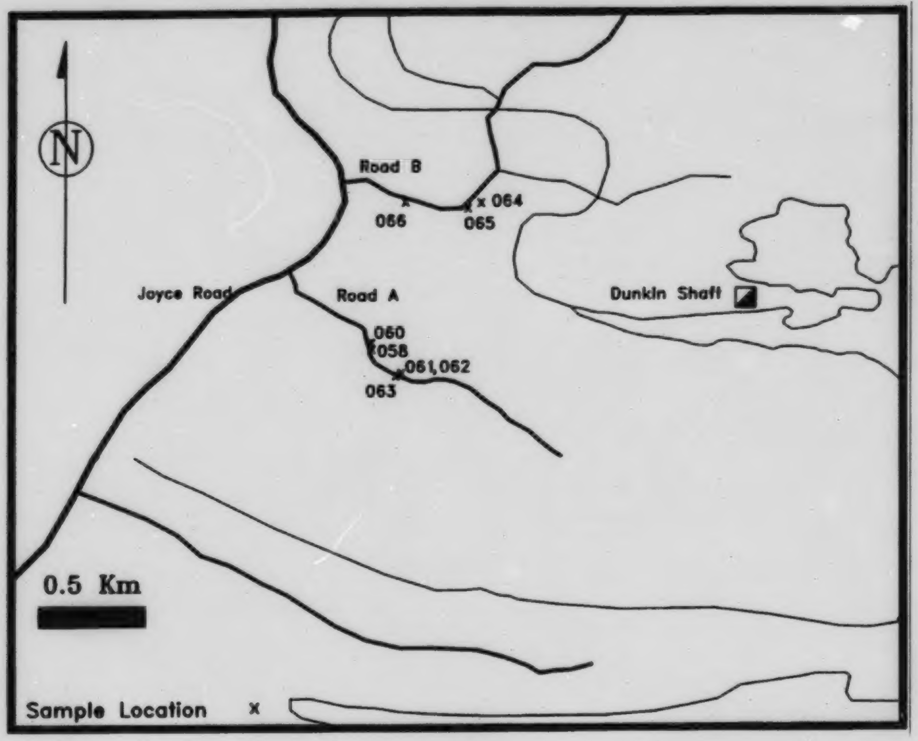

Figure 6. Sampling west of Dunkin shaft.

Table 8. Dunkin occurrence precious and base metal assays.

Sample Detection Limit	Au 5 ppb	Pd 8 ppb	Pt 8 ppb	Ag 1 ppm	Cu 2 ppm	Pb 12 ppm	Zn 3 ppm	As 2 ppm	Cr 4 ppm	Ni 2 ppm
2001CS037	157.32	nm	nm	1	6	nd	15	7	19	nd
2001CS038	7.50	nm	nm	nd	4	nd	11	3	12	nd
2001CS039	nd	nd	nd	3	27	nd	82	60	214	77
2001CS040	383.52	nm	nm	1	10	nd	11	19	13	nd
2001CS042	56.34	nm	nm	nd	6	nd	12	4	36	nd
2001CS043	nd	nd	nd	nd	28	nd	74	3	2958	1150
2001CS044	10.95	38.33	10.31	nd	1953	7	208	33	209	205
2001CS045	nd	nd	nd	nd	12	5	85	2	6	nd
2001CS046	nd	nm	nm	nd	3	nd	19	nd	nd	4
2000CS058	nd	nm	nm	3	nm	nm	nm	nm	nm	nm
2000CS060	nd	nm	nm	nd	nm	nm	nm	nm	nm	nm
2000CS061	nd	nm	nm	3	97	49	45	nd	nm	nm
2000CS062		nm	nm	nd	nm	nm	nm	nm	nm	nm
2000CS063	nd	nm	nm	nd	nm	nm	nm	nm	nm	nm
2000CS064	370.62	nm	nm	1	nm	nm	nm	nm	nm	nm
2000CS065	6.42	nd	nd	nm	35	nm	nm	nm	112	71
2000CS066	15.10	nm	nm	4	nm	nm	nm	nm	nm	nm

nd, not detected; nm, not analysed for

Analyses by Geoscience Laboratories, Ministry of Northern Development and Mines, Sudbury, ON.

Sample Descriptions	
2001CS037	quartz vein
2001CS038	quartz vein
2001CS039	gabbro with disseminated sulphides
2001CS040	quartz vein
2001CS042	quartz vein from dump
2001CS043	schistose gabbro from dump
2001CS044	coarse sulphide bearing gabbro from dump
2001CS045	fine sulphide bearing gabbro(?) from dump
2001CS046	quartz-iron carbonate vein from dump
2000CS058	mafic metavolcanic
2000CS060	quartz vein
2000CS061	mafic metavolcanic
2000CS062	quartz vein
2000CS063	quartz vein
2000CS064	quartz vein
2000CS065	gabbro
2000CS066	mafic metavolcanic

The property has a history of high, but erratic gold assays from surface sampling. Assay results filed with the available diamond drill results from the Dunkin shaft area do not show supporting gold values (Russell and Hood 1988). The presence of numerous gold-bearing quartz veins in the area near the Dunkin shaft indicates the property has the potential to host economic gold mineralization. Platinum and palladium, accompanied by elevated Cu, Ni and Cr, are present in one sample of the gabbro and a second sample shows high Cr and Ni although Pt and Pd were not detected. These results from very limited sampling indicate that there is potential for platinum and palladium mineralization. A more extensive sampling program should be directed at the Dunkin gabbro sill and some of the other gabbro sills in the immediate area.

RECONNAISSANCE SAMPLING IN THE AREA WEST OF THE DUNKIN PROPERTY

The area west of the Dunkin Property has been mapped by Pryslak (1986) and is included in assessment work reports by several companies including Willy (1987) and Woolham (1987). Pryslak mapped the area as massive to pillowed mafic metavolcanics intruded by narrow gabbro sills. The results of reconnaissance examination and limited sampling in 2000 are described below. The roads and sample locations are shown on Figure 6.

Road A

The area examined is west and slightly south of the Dunkin Shaft. The rocks exposed along Road A are dark green, fine-grained massive to pillowed mafic metavolcanics; pillows are poorly developed. No gabbroic rocks were identified. There is a small amount of fine disseminated pyrite in samples 2000CS058 and 2000CS059. A weak shear zone strikes 134° and is approximately 1 m wide. Narrow (5 to 12 cm) quartz veins are present in several outcrops. There are two apparent types of veins: 1) vertical-dipping white, unmineralized veins of varying strike; and 2) shallow dipping (45° south) grey quartz veins with small amounts of tourmaline and minor pyrite. These veins strike 105° and 150° and may be analogous to the blue-grey quartz veins described from the Dunkin property. There is no evidence of exploration activity in this area (pits, stripping, sampling) although the area has been examined during exploration activities directed at the nearby Dunkin gold prospect on Narrow Lake. Samples assayed for gold and base metals returned background values only. Work reported by Willy (1987) indicates the area to be underlain by massive and pillowed mafic metavolcanics showing north facing pillows. Willy (1987) shows three shear zones: one striking approximately 100° to 110°, another at approximately 025°, and a third at 170° interpreted from the results of a VLF survey (Woolham 1987). He also shows a narrow (10 cm), milky white quartz vein but does not report any assay results from this vein or any other rocks from the Road A exposures. Woolham (1987) reported on the results of magnetic and VLF electromagnetic surveys. These surveys show a weak magnetic trend at approximately 120°, which corresponds to the strike of the bedrock units.

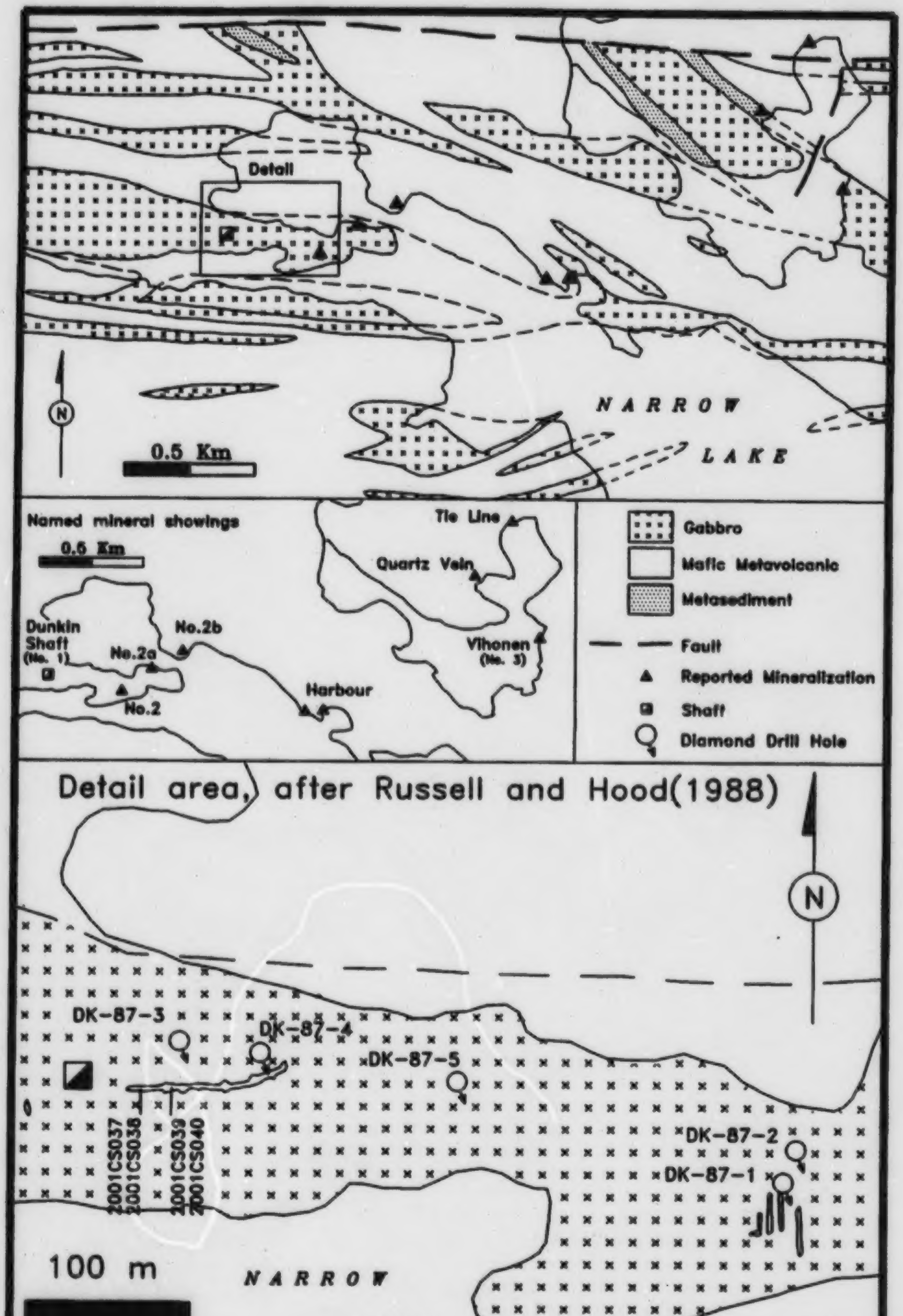
Detail
N
0.5 Km
NARROW
LAKE
Named mineral showings
0.5 Km
Dunkin Shaft (No. 1)
No.2a
No.2b
No.2
Harbour
Tie Line
Quartz Vein
Vihonen (No. 3)
Gabbro
Mafic Metavolcanic
Metasediment
Fault
Reported Mineralization
Shaft
Diamond Drill Hole
Detail area, after Russell and Hood(1988)
N
DK-87-3
DK-87-4
DK-87-5
DK-87-2
DK-87-1
2001CS037
2001CS038
2001CS039
2001CS040
100 m
NARROW
LAKE

Figure 7. Dunkin shaft area, geology *after* Pryslak (1986).

Road B

The area examined is west and slightly north of the Dunkin gold prospect. No pits, trenches or stripped areas were seen in the area examined. Bedrock exposures have been enlarged during road construction and logging activity. The pillowed, mafic metavolcanic rocks are foliated at 110° and show extensional features evidenced by pillow elongation and stretched amygdules. Mineralization consists of a quartz vein 15 cm wide striking 042° and a small amount of disseminated pyrite in the basalt. A sample of the quartz vein (2000CS064) assayed 370.62 ppb Au. The rusty weathering basalt and a gabbroic dike showed only background level assays. Gabbroic rocks are present in the form of a dike striking 120° (2000CS065).

Rare Metal–Pegmatites – C. Storey

Reconnaissance sampling of pegmatitic rocks continued. The rational is to find pegmatites and/or fertile granites with rare metal exploration potential. Increased exploration potential is based on the presence of elevated levels of rare metals or rare metal pathfinder elements and evidence of increased fractionation of the pegmatite liquid. Fractionation is determined by examining the ratios of various trace elements and some of the major elements. Large, blocky potassium feldspar crystals are often used for this purpose as they are sensitive to the fractionation level of the pegmatite (Breaks et al.1999, 2001). The elemental ratios K/Rb, K/Cs and Nb/Ta in both the potassium feldspar and the bulk pegmatite or fertile granite along with Na_2O/K_2O are particularly useful for this. Breaks (1989) indicates that a low Na_2O/K_2O ratio indicates a less fractionated pegmatite, but there is considerable variation. In general, fertile granites and their associated pegmatites are enriched in lithium, cesium, berylium, gallium, yttrium, tin, tantalum/niobium and rubidium such that these elements are a good exploration guide to potential rare element pegmatites.

The Rb/Sr ratio increases with fractionation, whereas K/Rb and K/Cs ratios decrease with fractionation (Breaks 1989). Results shown by Breaks (1989) and Cerny and Meintzer (1988) show considerable variation even within samples from the same pegmatite, but the overall trend is to higher Rb/Sr ratios from rare element pegmatites even if absolute Li, Be and Cs values are relatively low. A plot of K/Rb vs Cs in potassium feldspar samples can differentiate between barren pegmatites, fertile granites and complex-type rare metal pegmatites. In many of the samples analyzed, Cs was not detected; in these cases a K/Rb greater than 100 was taken to indicate a barren pegmatite, K/Rb between 10 and 100 a fertile granite, and K/Rb less than 10 indicates a potential rare metal pegmatite. Table 14, from Galeschuk (1999), is a table of anomaly levels for Li, Cs and Rb for a pegmatite property in the Separation Rapids pegmatite field. These numbers were derived from a statistical analysis of the results of a lithogeochemical survey. While these values are specific to the Separation Rapids property they are useful for comparison purposes and lend support to the values used to designate pegmatites as having some rare metal potential.

Five areas were sampled with limited success. Analyses of the samples showed little enrichment in Li, Be, Cs, Rb, Ta. In many cases the trace elements were not detected. A sample (2001CS011) of the host rock of the Sandy Creek Beryl Pegmatite, a well-known rare element pegmatite, was included for comparison purposes. This sample shows elevated Li, Cs, Rb and Sn.

DRYDEN AREA

Two pegmatite dike groups were sampled: one in the Highway 17 road cut at the Dryden cemetery (Dryden Cemetery pegmatite) and the other in a Highway 17 road cut at the east end of Dryden (Dryden East pegmatite). The area was mapped by Breaks and Kuehner (1984) as migmatised arkose and wacke metasediments with intrusive granite mobilizate (i.e., pegmatitic dikes and patches). Garnet and andalusite are characteristic metamorphic minerals. These rocks are near the western limit of the Dryden pegmatite field. The pegmatite exposures show multiple dikes ranging from a few centimetres to several metres in width. The gross composition is quartz-feldspar-biotite-muscovite; grain size and texture ranges from fine granitic to coarse. The pegmatite dikes contain both biotite and muscovite although biotite is the predominant mica. Minor garnet, tourmaline and apatite are present as

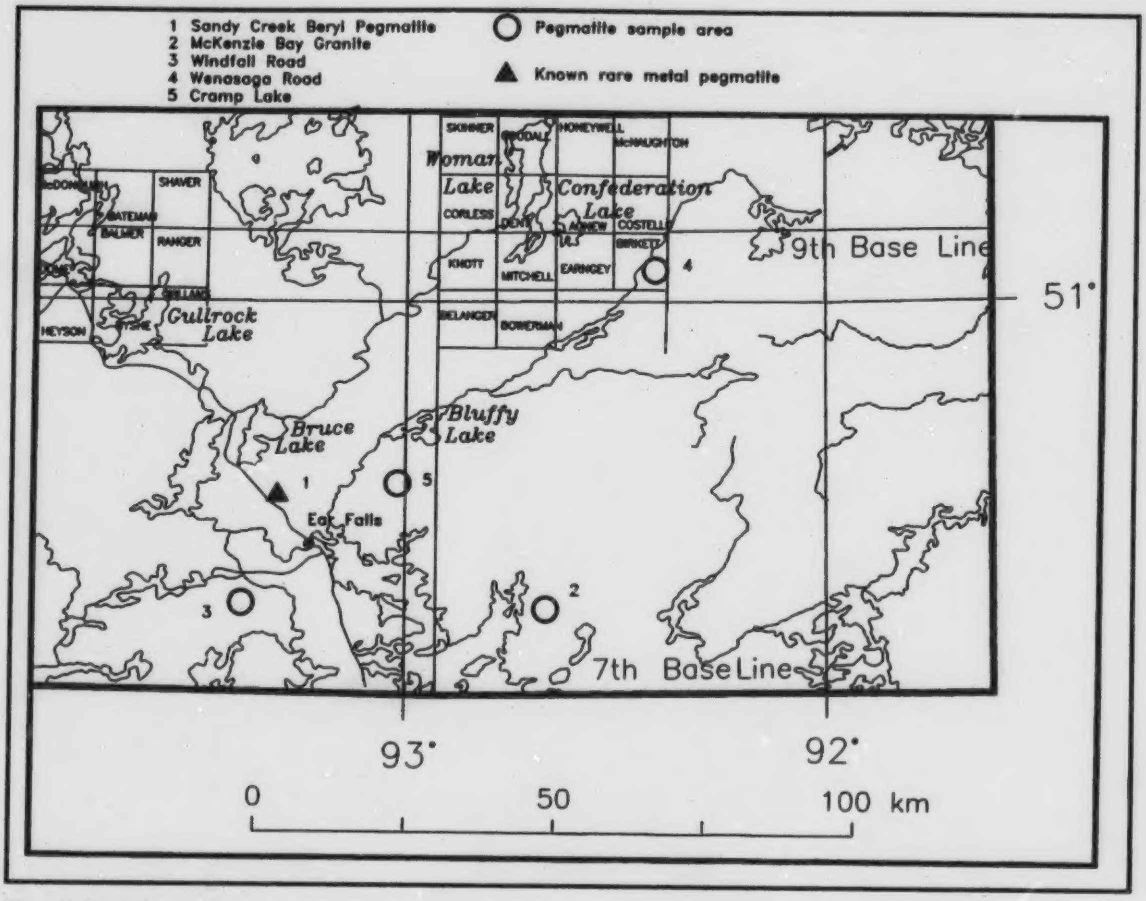
1 Sandy Creek Beryl Pegmatite
2 McKenzie Bay Granite
3 Windfall Road
4 Wenasaga Road
5 Cramp Lake
Pegmatite sample area
Known rare metal pegmatite
Woman Lake
Confederation Lake
Gullrock Lake
Bruce Lake
Bluffy Lake
Ear Falls
9th Base Line
7th Base Line
51°
93°
92°
0
50
100 km

Figure 8. Pegmatite sample areas

accessory minerals. The host rock is dark grey, biotite metasediment (biotite, quartz and feldspar are the dominant minerals). Xenoliths and septa of the host rock are common in the pegmatite dikes. Samples of the pegmatite and host rock were analyzed (Table 9); results are presented in Tables 10 to 13.

The samples from the Dryden East pegmatite show elevated Cs in the bulk pegmatite and are accompanied by high Rb/Sr, K/Rb and K/Cs, lending support to this being a fractionated pegmatite. A sample of potassium feldspar is anomalous in Cs and Rb, with element ratios that support a high level of fractionation. These pegmatites are part of the Dryden pegmatite field. The Dryden Cemetery pegmatite samples do not support a high level of fractionation although the two host rock samples show elevated Li and Cs when compared to crustal abundances (Table 15) and the TANCO results (Table 14).

MCKENZIE BAY GRANITE

The McKenzie Bay Granite is a two-mica granite exposed over an area of several square kilometres and is part of the Wapesi Lake batholith. No rare element pegmatite dikes have been reported from this area. Breaks et al. (1976b) mapped the area as homogeneous diatexite of quartz monzonite composition with muscovite. Raoul (1992) carried out an evaluation of a small area for its building stone potential. Gabrial (2000) examined similar rock also for its building stone potential. The rock is of uniform light grey to white colour with a very weak foliation shown by biotite flake alignment. Biotite makes up an estimated 5 to 10% of the rock and is the only identified mafic mineral present. A small amount of fine muscovite is present in all the samples examined. Analytical results for three samples (2001CS007, 008, 009) are in Tables 10 and 11. Lithium is slightly elevated when compared to average upper continental crust (Table 15) but the other trace elements do not support this as a fertile granite.

WINDFALL ROAD PEGMATITES

This area is underlain by migmatitic metasediments (homogeneous diatexite to metatexite) (Breaks et al. 1976a). The mobilizate phase has a quartz monzonite to trondhjemite composition where the composition has been determined. In the area examined the mobilizate phase of the diatexite is composed primarily of white pegmatitic granitoid dikes and a smaller proportion of pink pegmatite. The width of the dikes is variable and strike length is not exposed. The orientation of the dikes is usually subparallel to the foliation of the host rock, which ranges from 070° to 095°. The dikes are often irregular in width, and illustrate boudinage features. Some of the dikes show a foliation similar to the host rock and may have been deformed during or shortly after emplacement. The predominant mineralogy is quartz, feldspar, biotite with accessory apatite, tourmaline and garnet. Muscovite is rarely present. There are multiple generations of pegmatite dikes. Narrow dikes and irregular patches of white pegmatite were seen cutting older pegmatite dikes of similar composition. In a few places pink pegmatite dikes cut the white pegmatites. Rare metal pegmatites have not been reported from this area and there is no recorded exploration activity. Analytical results for samples of bulk pegmatite and potassium feldspar are in Tables 10 to 13. The results do not indicate that these pegmatites are highly fractionated, as a number of the trace elements required to assist in determining fractionation were not detected. One sample (2001CS021) shows a slightly elevated Li value. The large number and apparent multiple generations of pegmatite bodies in this area warrants further investigation and sampling.

WENASAGA ROAD (ALLISON LAKE BATHOLITH)

Preliminary reconnaissance sampling of this area in Birkett Township was begun. The area was sampled and described by Breaks et al. (2001). In late fall of 2001 C. Storey examined an area west of Jubilee Lake. The bedrock exposed is biotite metasediment cut by numerous dark grey mafic dikes and narrow quartz veins. A sample from one of these veins (2001CS058) was assayed, and gold was not detected. A sample of a mafic dike (2001CS060) and rusty weathering metasediment (2001CS059) were assayed for Au, Pt and Pd, none of which were detected. The layering in the metasediment strikes 055° to 070° and dips steeply south. There is abundant white pegmatite float but no pegmatite exposed in outcrop in the area examined. Samples from the float were analyzed and the results are in Tables 10 and 11. Two of the pegmatite float samples (2001CS055 and 057) show high Rb/Sr, and sample 2001CS055 also has a low K/Rb. The potassium feldspar sample does not show high fractionation. These pegmatite float boulders are likely derived from granitoid rocks further east and north. This area warrants more investigation after the results reported by Breaks et al. (2001).

CRAMP LAKE

Additional pegmatites were sampled in the Cramp Lake area in an attempt to isolate previously reported Li anomalies (Blackburn et al. 1999). The samples analyzed, including one from a small pegmatite exposure on the Eagle Road, did not show high levels of Li, Be, Cs or Rb. These samples do not appear to be from highly fractionated pegmatites (Tables 10 to 13).

CONCLUSION

While the work did not discover pegmatites highly anomalous in rare metals, it did indicate two areas worth further investigation, the Allison Lake Batholith and the Windfall Road area. The Dryden East pegmatite is part of the Dryden pegmatite field, which is well known for its rare metal pegmatites.

Table 9. Pegmatite samples.

Sample	Site	Rock type	Easting	Northing
2001CS003	Dryden east	K feldspar	513192	5514669
2001CS004	Dryden east	Coarse pegmatite	513192	5514669
2001CS005	Dryden east	Fine pegmatite	513192	5514669
2001CS006	Dryden east	Host rock xenolith	513192	5514669
2001CS007	McKenzie Bay Granite	2 mica granite	524475	5599531
2001CS008	McKenzie Bay Granite	2 mica granite	524423	5599505
2001CS009	McKenzie Bay Granite	2 mica granite	524221	5595412
2001CS010	Eagle Road	Pegmatite	489221	5615401
2001CS011	Sandy Creek Beryl	Amphibolite host rock		
2001CS016	Windfall Road	Pegmatite	476694	5597209
2001CS017	Windfall Road	Pegmatite	476694	5597209
2001CS021	Windfall Road	Pegmatite	476506	5597329
2001CS023A	Windfall Road	Pegmatite	473668	5598711
2001CS023B	Windfall Road	Pegmatite	473668	5598711
2001CS023C	Windfall Road	K feldspar	473668	5598711
2001CS026	Windfall Road	Pegmatite	471416	5600714
2001CS047	Dryden Cemetery	Host rock	511023	5516133
2001CS048	Dryden Cemetery	Host rock	511023	5516133
2001CS049	Dryden Cemetery	Pegmatite	511023	5516133
2001CS050	Dryden Cemetery	K feldspar	511023	5516133
2001CS051	Dryden Cemetery	Pegmatite	511023	5516133
2001CS052	Dryden Cemetery	Pegmatite	511023	5516133
2001CS053	Dryden Cemetery	Pegmatite	511023	5516133
2001CS054	Dryden Cemetery	K feldspar	511023	5516133
2001CS055	Wenasaga Road	Pegmatite Float	539488	5653421
2001CS056	Wenasaga Road	Pegmatite Float	540739	5654001
2001CS057	Wenasaga Road	Pegmatite Float	541153	5654435
2001CS058	Wenasaga Road	Quartz Vein	540173	5653835
2001CS059	Wenasaga Road	Metasediment	539564	5653483
2001CS060	Wenasaga Road	Mafic dike	538867	5652854
2001CS061	Cramp Lake	Pegmatite	498766	5618565
2001CS062	Cramp Lake	K feldspar	498865	5618681

All locations are in UTM Zone 15 and were taken using NAD27 datum.

Table 10. Major element analyses of pegmatite samples.

Analyte	SiO_2	Al_2O_3	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	TiO_2	Fe_2O_3	LOI	TOTAL	Na_2O/	K
Units	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	K_2O	ppm
Detection Limit	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	n/a		6
2001CS004	75.84	13.76	0.04	n.d.	0.31	5.08	3.28	0.07	0.01	0.74	0.4	99.52	1.55	29413
2001CS005	79.07	11.9	0.11	n.d.	0.26	4.22	3.23	0.13	n.d.	0.56	0.38	99.88	1.31	29390
2001CS007	72.36	14.75	0.01	0.44	0.9	3.42	5.56	0.14	0.2	1.35	0.81	99.95	0.62	49294
2001CS008	70.88	15.52	0.01	0.55	0.66	3.18	6.29	0.15	0.25	1.8	0.84	100.13	0.51	54695
2001CS009	71.96	14.78	0.01	0.36	0.33	3.59	6.54	0.13	0.19	1.33	1.03	100.26	0.55	56503
2001CS010	71.69	16.87	n.d.	0.09	2.07	4.88	3.14	0.13	0.02	0.2	0.55	99.64	1.55	28093
2001CS016	73.74	15.94	0.02	0.22	2.14	5.43	1.79	0.16	0.03	0.6	0.85	100.92	3.03	15476
2001CS017	63.37	19.49	0.03	0.38	0.44	2.88	10.67	0.23	0.02	0.8	1.2	99.51	0.27	89482
2001CS021	68.05	15.7	0.06	2.04	2.26	3.62	2.11	0.15	0.45	4.56	1.14	100.13	1.72	20581
2001CS023A	73.76	15.38	0.09	0.08	0.42	4.82	3.3	0.34	0.01	0.91	0.82	99.94	1.46	29528
2001CS023B	72.85	16.49	0.01	0.05	0.18	3.55	6.93	0.38	0.01	0.18	0.7	101.34	0.51	60481

Analyte	SiO_2	Al_2O_3	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	TiO_2	Fe_2O_3	LOI	TOTAL	Na_2O/ K_2O	K
Units	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%		ppm
Detection Limit	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	n/a		6
2001CS026	69.94	14.73	0.01	0.52	0.39	2.15	8.36	0.06	0.15	1.18	0.82	98.32	0.26	72005
2001CS049	73.7	15.02	n.d.	0.09	1.48	5.66	1.9	0.08	0.02	0.47	0.66	99.09	2.98	17374
2001CS051	73.94	14.98	n.d.	0.12	0.98	3.96	4.42	0.07	0.03	0.48	0.61	99.62	0.90	39546
2001CS052	73.46	15.33	0.05	0.21	3.31	5.25	0.44	0.17	0.06	1.01	0.35	99.62	11.93	4392
2001CS053	72.47	15.32	0.03	0.78	1.45	4.57	2.2	0.08	0.2	2.44	0.94	100.48	2.08	21387
2001CS055	74.08	16.05	0.01	0.05	0.16	5.48	2.99	0.15	0.01	0.49	1.05	100.53	1.83	28209
2001CS056	71.67	15.63	n.d.	0.12	0.21	3.08	8.37	0.16	0.03	0.45	0.56	100.27	0.37	70524
2001CS057	71.42	13.96	0.12	0.03	0.49	3.94	5.44	0.03	0.02	0.63	0.5	96.59	0.72	47787
2001CS061	74.82	13.93	0.05	0.17	0.65	3.36	5.46	0.12	0.01	1.04	0.55	100.16	0.61	48535

n.d. not detected

Analyses by Geoscience Laboratories, Ministry of Northern Development and Mines, Sudbury, ON.

Table 11. Trace element analyses of pegmatite samples

Analyte	Li	Cs	Be	Co	Cu	Ga	Nb	Rb	Sr	Sc	Sn	Ta	Th	V	Y	Zn	Zr	Rb/Sr	K/Rb	K/Cs
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm			
Detection Limit	3	7	3	2	5	3	1	2	2	1	5	10	3	4	1	2	3			
2001CS004	4	57	5	nd	nd	34	71	558	11	1		29	nd	nd	19	23	12	50.73	52.71	516.02
2001CS005	4	9	13	nd	nd	23	19	457	11	nd		15	nd	nd	17	16	15	41.55	64.31	3265.55
2001CS006	159	62	6	18	10	20	11	502	265	9		nd	5	78	23	106	111	n/a	n/a	n/a
2001CS007	52	nd	nd	nd	nd	27	6	222	133	nd	nd	nd	17	5	4	44	133	1.67	222.04	-
2001CS008	48	8	nd	nd	nd	27	9	237	133	nd	nd	nd	23	13	6	49	167	1.78	230.78	6836.87
2001CS009	21	nd	nd	nd	4	24	6	225	131	nd	nd	nd	18	4	3	25	137	1.72	251.12	-
2001CS010	30	nd	nd	nd	3	23	nd	50	384	nd	nd	nd	nd	nd	1	13	14	0.13	561.86	-
2001CS011	1486	275	15	36	2	35	22	706	282	21	44	11	7	152	9	295	106	n/a	n/a	n/a
2001CS016	10	nd	nd	nd	5	21	nd	31	199	nd	nd	nd	nd	nd	5	18	27	0.16	499.23	-
2001CS017	10	nd	4	nd	2	22	nd	205	246	nd	nd	nd	nd	nd	13	20	29	0.83	436.50	-
2001CS021	77	nd	nd	16	33	24	5	93	291	15	nd	nd	6	104	15	60	100	0.32	221.30	-
2001CS023A	23	nd	nd	nd	nd	24	nd	68	20	nd	nd	nd	nd	nd	2	20	20	3.40	434.24	-
2001CS023B	15	nd	nd	nd	nd	21	nd	142	21	nd	nd	nd	nd	nd	nd	15	5	6.76	425.92	-
2001CS026	35	nd	nd	nd	6	18	2	172	414	nd	nd	nd	nd	14	nd	31	11	0.42	418.63	-
2001CS047	159	49	nd	28	36	32	9	452	364	26	7	nd	12	175	18	109	180	n/a	n/a	n/a
2001CS048	121	53	4	34	233	34	7	432	189	30	5	nd	nd	196	19	331	146	n/a	n/a	n/a
2001CS049	12	nd	nd	nd	5	28	4	68	81	nd	nd	nd	nd	nd	5	19	11	0.84	255.50	-
2001CS051	16	nd	nd	nd	nd	28	6	171	75	nd	nd	nd	nd	nd	4	23	5	2.28	231.26	-
2001CS052	17	nd	8	nd	nd	27	12	32	204	nd	nd	nd	nd	nd	8	27	27	0.16	137.25	-
2001CS053	58	nd	nd	nd	3	39	30	160	83	6	nd	nd	5	17	19	71	27	1.93	133.67	-
2001CS055	36	nd	5	nd	nd	45	46	475	10	nd	nd	nd	nd	nd	nd	28	46	47.5	59.39	-
2001CS056	45	nd	nd	nd	nd	29	15	396	45	nd	nd	nd	nd	nd	3	30	15	8.80	178.09	-
2001CS057	20	nd	nd	nd	nd	37	30	333	10	nd	nd	nd	5	nd	22	16	30	33.30	143.50	-
2001CS061	17	nd	nd	nd	nd	18	nd	100	131	nd	nd	nd	nd	nd	8	13	66	0.76	485.35	-

nd, not detected; in all samples W not detected, Mo not detected; n/a ratio not applicable to rock type, - ratio not calculated

Analyses by Geoscience Laboratories, Ministry of Northern Development and Mines, Sudbury, ON.

Table 12. Major element analyses of potassium feldspar samples.

Analyte	SiO_2	Al_2O_3	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	TiO_2	Fe_2O_3	LOI	TOTAL	Na_2O/K_2O	K
Units	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%		Ppm
Detection Limit	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	n/a		6
2001CS-003	52.07	32.60	N.D.	0.08	0.06	2.07	10.49	0.07	N.D.	0.06	1.57	99.08	0.20	94886
2001-CS-023c	53.24	31.96	N.D.	0.05	0.1	3.35	9.01	0.43	N.D.	N.D.	1.32	99.47	0.37	81033
2001CS-050	64.4	19.46	N.D.	0.04	0.11	2.45	13.58	0.19	N.D.	0.05	0.53	100.81	0.18	112796
2001CS-054	63.79	20.51	N.D.	0.04	0.29	2.84	12.13	0.19	N.D.	0.04	0.81	100.64	0.23	104223
2001CS-062	64.67	19.19	N.D.	N.D.	0.17	2.83	12.92	0.3	N.D.	0.02	0.37	100.49	0.22	106030

Analyses by Geoscience Laboratories, Ministry of Northern Development and Mines, Sudbury, ON.

Table 13. Trace element analyses of potassium feldspar samples.

Analyte	Li	Cs	Ga	Nb	Rb	Sr	Sn	Ta	Th	Y	Zr	Rb/Sr	K/Rb	K/Cs
Units	ppm	ppm	ppm	Ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm			
Detection Limit	3	7	3	1	2	2	5	10	3	1	3			
2001CS-003	nd	360	37	5	2063	29	8	nd	nd	45	10	71.14	45.99	263.57
2001-CS-023c	11	nd	28	Nd	188	21	nd	nd	nd	nd	6	8.9	431.03	-
2001CS-050	6	nd	23	Nd	453	87	nd	nd	nd	nd	nd	5.2	249.00	-
2001CS-054	6	nd	24	Nd	412	88	nd	nd	nd	3	nd	4.7	252.97	-
2001CS-062	3	nd	18	Nd	100	131	nd	nd	nd	8	66	0.76	1060.30	-

Analyses by Geoscience Laboratories, Ministry of Northern Development and Mines, Sudbury, ON.

Table 14. Separation Lake 1996 lithogeochemical anomaly thresholds.
From TANCO (Galeschuk 1999). Values in ppm.

Rock	Background			Possible Anomalous			Anomalous			Highly Anomalous		
Type	Li	Cs	Rb	Li	Cs	Rb	Li	Cs	Rb	Li	Cs	Rb
Mafic Volcanic	<35.5	<1.7	<72.2	35.6-55.9	1.7-5.6	72.2-100.9	55.9-227.7	5.6-39.6	100.9-484.6	>227.7	>39.6	>484.6
Felsic Volcanic	<16.6	<3.0	<75.8	16.6-38.9	3.0-5.5	75.8-159.7	38.9-109.8	5.5-21.9	159.7-406.5	>109.8	>21.9	>406.5
Mafic Intrusive	<46.0	<4.2	<29.6	46.0-54.0	4.2-6.4	29.6-38.4	54.0-334.6	6.4-15.1	38.4-134.3	>334.6	>15.1	>134.3
Felsic Intrusive	<27.2	<6.6	<302.4	27.2-42.3	6.6-15.2	302.4-485.1	42.3-86.1	15.2-29.4	485.1-1769.4	>86.1	>29.4	>1769.4
Peg. Granite	<49.6	<12.4	<230.4	49.6-116.4	12.4-16.2	230.4-321.3	116.4-380.6	16.2-125.7	321.3-2292.7	>380.6	>125.7	>3392.7

Table 15. Average abundances of rare elements and selected ratios.
After Breaks et al. (2001). Values in ppm

	Li	Cs	Be	Ga	Nb	Rb	Sn	Ta	K/Cs	K/Rb	Nb/Ta
Average Upper Continental Crust	20	3.7	3	17	25	112	5.5	2.2	7630	252	11.4
Fine-grained leucogranite	81	8	4	38	24	305	9	4.5	11000	159	5
Pegmatitic leucogranite	51.7	14	27	20	18	473	19	2.7	7880	165	1.71

RECOMMENDATIONS FOR EXPLORATION

Gold

Spectacular 'High Grade Zone' reserve grades (1.68 million tonnes at a gold grade of 63.8 g/t or 2.05 opt) at Goldcorp Inc.'s Red Lake Mine have led to re-evaluation of past and present producers and gold prospects throughout the Red Lake–Birch–Uchi belt. Multiple periods of quartz- and arsenopyrite-rich, selective carbonate vein replacement, during a long and complex period of deformation history, appear to be the key to the high concentration of gold found within mineralized structures (Parker 2000). Many historic gold properties in the belt are under-explored and offer excellent potential for high grade gold mineralization.

Current research by the OGS and GSC (Dubé et al. 2000) has brought new insights into high temperature, disseminated-replacement style gold mineralization, exemplified by the Madsen deposit, where approximately 2.45 million ounces were produced (*see* Table 3). Calc-silicate-altered carbonatized mafic volcanic rocks occur around the margins of the Killala–Baird batholith and Walsh Lake pluton at Red Lake. A number of gold occurrences within this high temperature alteration assemblage now warrant re-examination in the light of current research (Parker 2000, 2001).

Base Metals

The Red Lake–Birch–Uchi greenstone belt contains volcanogenic massive sulphide deposits hosted by felsic volcanic rocks classed as FII and FIII type rhyolites, which are considered highly prospective for large, world-class (Kidd Creek/Noranda type) deposits (Parker 1999).

The arc-related mafic to felsic units constitute the majority of exposures in the eastern portion of the belt. Numerous volcanogenic massive sulphide deposits and prospects, often associated with strong proximal chloritic or alumino-silicate hydrothermal alteration, occur along a 100 km stretch of the belt. Increased prospector activity and major company participation has heightened awareness of the potential of the belt to host a world-class, base metal sulphide deposit.

Copper-Nickel-Platinum Group Elements

Exploration for platinum group metals intensified in the Red Lake belt after the discovery of significant palladium and nickel values by Goldcorp Inc. and Rubicon Minerals Corp. in 2000. The Red Lake–Birch–Uchi greenstone belt is endowed with mafic and ultramafic intrusive rocks that intrude sulphidic volcaniclastic and metasedimentary rocks that have the potential to host palladium-platinum mineralization similar to that discovered by the two companies. Properties with known potential are listed in Table 16. Red Lake belt areas are generally staked, but a significant number are available for option.

Base metal sulphide mineralization is associated with massive, layered and brecciated gabbros and peridotitic intrusive rocks found in several greenstone belts north of Red Lake. Historically, platinum group element assaying was not performed on these occurrences. Most of these areas are open for staking.

Table 16. Copper-nickel-platinum group element properties and areas.

Property/Deposit Name (Claim Sheet, NTS)	Disposition	Geology/Mineralization	Reserves/Assays
Red Lake Belt:			
Trout Bay PGE includes,	staked	mafic intrusion at contact with iron fm.	7.07 g/t Pd, 7.08% Ni; 6.06 g/t Pd, 5.31% Ni in grab samples
Trout Bay Nickel (Mulcahy Tp. 52M/01SE)	staked	disseminated to semi-massive pyrrhotite, pentlandite, chalcopyrite, pyrite in basal layer of gabbro sill (altered to serpentine-amphibole schist)	approx. grade of 0.50% Ni, 0.25% Cu in 120 m long X 10 m wide X 140 m deep deposit
Trout Bay North (Ball Tp. 52M/01SW)	staked	disseminated sulfides in gabbro sill	0.35% Cu over 0.61 m in trench
Foley Lke. (Ball Tp. 52M/01SW)	P2370 Woodland Caribou Park Extension	disseminated sulfides in gabbro sill	0.35% Ni, 0.13% Cu over 1.5 m in DDH
Douglas Creek SE (Ball Tp. 52M/01SW)	P2370 Woodland Caribou Park Extension	disseminated sulfides in gabbro sill	0.69% Ni, 0.60% Cu over 0.61 m in DDH
Fahlgren Lke. (Mulcahy Tp. 52L/16NE)	staked	disseminated pyrrhotite, pentlandite, chalcopyrite in basal layer of gabbro sill	up to 0.60% Cu, 0.55% Ni in trenches
Olsen-McKey Showing (Mulcahy Tp. 52M/01SE)	staked	disseminated chalcopyrite and pyrrhotite in gabbro	0.32% Cu, nil Ni, 0.01 oz/t Pt in pits
Pipestone Bay (Todd Tp. 52M/01SE)	patented claims	disseminated sulfides in pillows near major UM intrusion	0.53% Ni, 0.38% Cu, 8.2 gpt Ag in grab sample by OGS
McDonough property (McDonough Tp. 52N/04NW)	staked	extensive disseminated cpy, po, py in gabbro	"anomalous platinum/palladium"
Peterson PGE (Balmer Tp. 52N/04SE) includes McDougal Lke. Occurrence	patented claims	fine grained mafic intrusion at contact with iron fm.	1.15 g/t Pd, 0.12 g/t Pt, 0.25 g/t Au over 21 cm
	patented claims	sulfide replacement of IF quartzite and argillite	0.48% Ni, 1.40% Cu over 0.70 m in DDH
Claremont (adj. to Bug River VMS occurrence) (Heyson Tp. 52K/13NW)	staked	massive pyrite and pyrrhotite in amphibolitic gabbro	2.48% Cu, 0.22% Ni in selected grab sample
St. Paul Bay (Baird Tp. 52N/04SW)	staked	20% sulfides in tuff sandwiched between ultramafics	Grab samples up to 0.58% Ni and 0.41% Cu
Slate Peninsula (Dome Tp. 52N/04SW)	staked	massive po-py at amphibolite-chert contact	0.05% Ni, 0.05% Cu, 0.02% Co, 0.03% Zn over 1.8 m in DDH
Pine South & Alcon Occurrence (Fairlie Tp. 52N/04SW)	staked	IF associated with mafic intrusive	0.31% Ni, 0.14% Cu in trench
	staked	cpy on fracture planes in tuff near UM dyke	0.62% Cu, 0.01 oz/t Au over 0.18 m in DDH
Pine Showing (Fairlie Tp. 52N/04SW)	staked	disseminated sulfides in IF adjacent to UM sill or flow	3.9% Cu, 0.15% Zn, 0.01 oz/t Au in selected grab samples

Birch-Uchi Lake Belt:			
Colberg Occurrence (Earngey Tp. 52N/02SE)	staked	disseminated to MS in middle portion of altered and faulted gabbro dyke	0.30% Ni, 1.44% Cu, 0.15% Co over 7.62 m chip sample; 0.27% Ni, 0.48% Cu, 340ppb Au, 100ppb Pt in grab sample
PT Zone (Birch Lke. Area 52N/08NW)	staked	disseminated sulfides; magnetite, hematite layers in gabbro	5.8 g/t Au, 4.4 g/t Pt, 3.4 g/t Pd, 9.4 g/t Ag, 0.8% Ni, 0.9% Cu over 1.5m
North of 51:			
Borthwick Lake (Setting Net Lke. Area 53C/13SE)	staked	layered ultramafic intrusion; brecciated gabbro, peridotite	
Peridotite Bay of North Spirit Lke. (Buckett Lke. Area 53C/10SW)	open	peridotite in contact with IF	0.14% Ni, 0.28% Cr in grab sample; 0.03% Ni, 0.14% Cu over 1.37 m in DDH
East Bay of North Spirit Lke. (Buckett Lke. Area 53C/10NE)	open	massive cpy, py at contact of peridotite/gabbro with IF	
Windigo South (Kippen Lke. Area 53G/05SW)	open	lenses 0.15 m long of massive py-cpy in gabbro sill	1.22% Cu, tr Au, in grab sample
Fox Bay Sill (Namaybin Lke. Area 53F/01NE)	open	serpentinite, dunite	
Seeber Lke. (Lingman and Seeber Lkes. Area 53F/15NE)	open	disseminated po, py in amphibolitic units within gabbro sill	
Ponask Lke. (Passmore Lke. Area 53K/02SE)	open	peridotite, dunite, serpentinite	
Hornby Lke (Hornby Lke. Area 53C/05NE)	open	disseminated po, cpy in diorite (hornblende-biotite qtz. diorite)	0.11% Ni, 0.11% Cu over 2.6 m in DDH

Rare Metals

Work in the area immediately south of the Red Lake–Birch–Uchi belt indicates the presence of highly fractionated pegmatite dikes accompanied by anomalous lithium, beryllium, cesium and tantalum. Current exploration work by Houston Lake Mining Inc. north of the Red Lake belt has defined a significant tantalum, lithium, cesium, rubidium, niobium, thallium and gallium prospect, which has led to significant levels of staking by other companies.

Table 17. Rare metal properties and areas.

Property/Deposit Name (Claim Sheet, NTS)	Owner	Geology/Mineralization	Reserves/Assays
Uchi and English River Subprovinces:			
Sandy Creek Beryl (Camping Lake Area, 52K/11NW)	staked	pale yellow beryl in apatite-muscovite-quartz-albite replacement zones in pegmatite	0.8% Be in beryl bearing pegmatite (Blackburn et al 1999)
Massberyl Lithium Mines Ltd. (Bluffy Lake Area, 52K/15SW)	open	fractionated pegmatite with anomalous lithium (Blackburn et al. 1999)	
Valor Lithium Mines (Curie Lake Area, 52K/16NE)	open	pale green beryl reported in drill core, pegmatite dikes hosted in rock interpreted to be intermediate metavolcanics and metasediments (assessment files)	

Property/Deposit Name (Claim Sheet, NTS)	Owner	Geology/Mineralization	Reserves/Assays
McCombe (Root Lake Area, 52J/13NE)	Patented Claims	highly fractionated pegmatite dikes hosted by mafic metavolcanics	2.3 million tons of 1.3% Li_2O (assessment files)
Consolidated Morrison (Root Lake Area, 52J/13NE)	H. A. Watt	spodumene reported from 4 pegmatites	2 samples 2.49% Li_2O and 5.91% Li_2O (assessment files)
Root Lake 5 Claim (Root Lake Area, 52J/13NE)	Patented Claims	spodumene reported from one diamond drill hole	
Root Lake 34 Claim (Root Lake Area, 52J/13NE)	staked	beryl crystals up to 3 mm reported in two diamond drill holes	
Cramp Lake (Ear Falls Area, 52K/11NE)	open	white muscovite-biotite-quartz-microcline pegmatite with anomalous Li (Storey 1990), exact location of original sample not known	
North of 51:			
Pakeagama Lake (Setting Net Creek Area, 53C/12NE)	Houston Lake Mining Inc.	complex type petalite subtype pegmatite with well developed internal zones	Channel sampling of the 13 metre wide Northern Wall Zone of the Pakeagama Lake pegmatite returned 344 g/t Ta_2O_5, 0.90% Rb_2O, 1776 g/t Cs_2O, 68.9 g/t Sn, 131.9 g/t Nb_2O_5, 1.34% Li_2O, 25.9 g/t Tl, and 42.2 g/t Ga over 11 metres.
Favourable Lake (Favourable Lake North Area, 53C/13NW)	John G. Brady, optioned to Houston Lake Mining Inc.	coarse grained to pegmatitic muscovite-biotite granite (fertile granite)	Electron microprobe analysis carried out on samples from the property have identified tantalum minerals ferrotantalite and ferrocolumbite
Bearhead Lake Holmquistite (Setting Net Lake Area, 53C/13SE)	Emerald Fields Resource Corporation	holmquistite in granitoid rocks, reported by Stone, Fogal and Fitzsimon (1993)	
Mattless Lake Beryllium (Setting Net Creek Area, 53C/12NE)	Emerald Fields Resource Corporation	beryllium, zinc, molybdenite and bismuth reported by Stone, Fogal and Halstead (1993)	
Pennock Lake Holmquistite (Setting Net Creek Area 53C/12NE)	Emerald Fields Resource Corporation	beryllium, zinc, molybdenite and bismuth reported by Stone, Fogal and Halstead (1993)	
Pennock Lake Spodumene (Setting Net Creek Area, 53C/12NE)	Emerald Fields Resource Corporation	beryllium, zinc, molybdenite and bismuth reported by Stone, Fogal and Halstead (1993)	0.52% Li reported by Ayres (1972)

Diamonds

Significant numbers of kimberlite indicator minerals in alluvium were found by OGS regional sampling in Paleoarchaean (ca. 3500 Ma) terrane at the northern margin of the Superior Province, 350 km north of Red Lake (Stone 2001). This crustal block is the continuation of the Knee Lake–God's Lake terrane in Manitoba, where diamond drilling was initiated earlier this year to trace bedrock sources of kimberlite indicator minerals. The Ontario portion of the terrane, most of which is open to staking, thus represents a favourable region to be explored for fertile kimberlites.

Wolfden Resources Inc.–Jonpol Exploration Ltd.–Northway Explorations Ltd. have performed preliminary exploration work, including diamond drilling, in the Stull–Ellard lakes area, within the region covered by the indicator mineral survey (*see* "Exploration Activity").

OGS ACTIVITIES AND RESEARCH BY OTHERS

There were seven projects undertaken in the Red Lake District in 2001 (letters keyed to Figures 1 to 4). Of these seven, five projects were by the Ontario Geological Survey (OGS) in collaboration with partners; and two projects were part of the Western Superior NATMAP (National Mapping Program), one of which was an OGS project and the other project a Geological Survey of Canada collaboration with partners.

A. G.M. Stott, Precambrian Geoscience Section, in collaboration with D.W. Davis of the Jack Satterly Geochronology Laboratory of the Royal Ontario Museum, reported results from a suite of samples collected for U/Pb zircon ages of metavolcanic and metasedimentary sequences of several greenstone belts in the North Caribou terrane and in other more northerly parts of the Sachigo Subprovince. The following greenstone belts and areas were reported on: North Caribou, Sandy Lake, and Windigo and Ellard Lake areas (Davis and Stott 2001).

B. P.J. Barnett, Sedimentary Geoscience Section, in a collaboration with V.H. Singhroy of the Canada Centre for Remote Sensing (CCRS), Natural Resources Canada, completed the second year of a two-year study to create digital Northern Ontario Engineering Geology Terrain-type maps for the far-north. The terrain maps will be created using the integration and interpretation of various types of remotely sensed imagery, digital elevation models, their derivatives and geological depositional models. Field work was completed in 9 pilot study areas including in the vicinity of Red Lake (Barnett and Singhroy 2001).

C. C. Vaillancourt and C.A. MacDonald, of the Precambrian Geoscience Section, in collaboration with R.A. Sproule of Laurentian University's Mineral Exploration Research Centre (MERC), and L.J. Hulbert of the Geological Survey of Canada, completed a one-year Operation Treasure Hunt project to study and inventory platinum group element (PGE) mineralization and mafic-ultramafic intrusions of Ontario. Products of the project findings were available in March of 2002 (Vaillancourt et al. 2001).

D. F.W. Breaks and J.B. Selway, of the Precambrian Geoscience Section, in collaboration with A.G. Tindle, of The Open University, Milton Keynes, UK, completed a one-year Operation Treasure Hunt project to study fertile peraluminous granites and related rare-element pegmatite mineralization in Ontario and produce a database for the entire Superior Province of Ontario. The field season focussed mainly on northwestern Ontario with a small amount work in northeastern Ontario (Breaks et al. 2001).

E. V.H. Singhroy of the CCRS, Natural Resources Canada, in collaboration with both the OGS and Goldcorp Inc., contracted an airborne survey flown over a portion of the Red Lake greenstone belt to acquire hyperspectral imaging data in August 2001 (Mike Dehn, Goldcorp Inc. personal communication, 2002; Rudd 2001).

The following two studies were part of the Western Superior NATMAP program:

F. J.R. Parker, Precambrian Geoscience Section, completed limited field work in the second year of a multi-year project, conducted in conjunction with the Western Superior NATMAP program. The limited field work focussed on the intermediate to felsic plutons that intrude the Red Lake greenstone belt and their relationship to the deformation zones and gold mineralization of the belt (Parker 2001).

G. B. Dubé, G. Chi, V. McNicoll, M. Villeneuve and O. Van Breemen of the Geological Survey of Canada, along with K. Williamson, and M. Malo from the University of Quebec's (INRS) research branch, and in collaboration with Goldcorp Inc., completed a second year of fieldwork at the Red Lake Mine for a multi-year study for contribution to the Western Superior NATMAP program. Work focused on detailed structural and alteration mapping within the HGZ and the upper levels of the mine, as well as selected stripped outcrops within the Red

Lake Mine Trend. A preliminary fluid inclusions study has been completed and U/Pb zircon and Ar/Ar amphibole dating is underway (B. Dubé, written communication, 2002).

Table 18. Publications received by the Red Lake Office in 2001.

Title	Author	Type and Year of Publication
Precambrian Geology of the Coldwell Alkalic Complex	E.C. Walker, R.H. Sutcliffe, C.S.J. Shaw, G.T. Shore and R.S. Penczak	OGS, Open File Report 5868, 1993
Results of Regional Till Sampling in the Western Part of the Shebandowan Greenstone Belt, Northwestern Ontario	A.F. Bajc	OGS, Open File Report 6012, 2000
Kimberlite, Base Metal, Gold and Carbonatite Exploration Targets, Derived From Overburden Heavy Mineral Data, Killala Lake Area, Northwestern Ontario	T.F. Morris, R.P. Sage, D.C. Crabtree, and S.A. Pitre	OGS, Open File Report 6013, 2000
Nature, Timing and Significance of Intermediate to Felsic Intrusive Rocks Associated with the Hemlo Greenstone Belt and Implications for the Regional Geological Setting of the Hemlo Gold Deposit	G.P. Beakhouse	OGS, Open File Report 6020, 2001
Stratigraphy of Epiclastic and Volcaniclastic Facies Units, Northern Birch-Uchi Greenstone Belt, Uchi Subprovince	J.R. Devaney	OGS, Open File Report 6030, 2001
Sedimentology and Volcanology of Selected Tectonized Stratigraphic Units, Southern Birch-Uchi Greenstone Belt, Uchi Subprovince	J.R. Devaney	OGS, Open File Report 6031, 2001
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A Study of Indicator Minerals for Kimberlite, Base Metals and Gold: Northern Superior Province of Ontario	D. Stone	OGS, Open File Report 6066, 2001
A Compilation of References for Kimberlite, Diamond and Related Topics	R.P. Sage and T. Gareau	OGS, Open File Report 6067, 2001
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Airborne Magnetic and Electromagnetic Surveys, Stormy Lake Area	Ontario Geological Survey	OGS, Map 82154, 2001
Airborne Magnetic and Electromagnetic Surveys, Stormy Lake Area	Ontario Geological Survey	OGS, Map 82155, 2001
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Title	Author	Type and Year of Publication
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Preliminary Report on the Stratigraphy and Structure of the Bee Lake Greenstone Belt, Superior Province, Northwestern Ontario	N. Rogers	GSC, Current Research 2001-C17, 2001
Preliminary Report on the Geology and Controlling Parameters of the Goldcorp Inc. High Grade Zone, Red Lake Mine, Ontario	B. Dube, K. Williamson, and M. Malo	GSC, Current Research 2001-C18, 2001
Three Hundred Million Years of Tectonic History Recorded by the Red Lake Greenstone Belt, Ontario	M. Sanborn-Barrie, T. Skulski, and J. Parker	GSC, Current Research 2001-C19, 2001
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Petrography and Geochemistry of the Komatiites and Komatiitic Basalts of the Red Lake Greenstone Belt, Ontario	LM. Bowes-Lyon	Unpublished B.Sc. thesis, McGill University, 2001

Table 19. Mineral deposits not being mined in the Red Lake District in 2001.

Abbreviations

AF	Assessment Files	MLS	Mining Lands, Sudbury
CMH	Canadian Mines Handbook	MR	Mining Recorder
GR	Geological Report	NM	The Northern Miner
MDC	Mineral Deposit Circular	OFR	Open File Report
MDIR	Mineral Deposit Inventory record	PC	Personal Communication

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Abino Bateman, Balmer and Dome Townships (52N/04SW)	Au	Total Granodiorite Zone drill indicated tonnage 405 162 tons 0.203 opt Au from three sub-zones (McClean 1976)	Goldcorp Inc.	AF	Patent
Aiken-Russet Baird Township (52K/13NW)	Au	Total reserves of 102 555 tons of 0.22 opt Au	Claude Resources Inc.	AF	Patent
Alcourt (Copper Man, Hanson-Campbell) Fairlie Township (52N/04SW)	Au	Reserves: 20 000 tons of 0.45 opt Au (Tilsley 1981) from 1959-60 diamond drilling No. 1 vein - 17 000 tonnes of 0.2429 oz per tonne Au (Tilsley 1981) from 1959-60 diamond drilling and 1981 sampling program	Unknown	AF	Patent
Annco Mine Dome Township (52N/04SW)	Au	Reserves: 50 000 tons of "Excellent Grade" (0.35 opt Au?)	Goldcorp Inc.	OFR Energy Mines and Resources Canada 1989	Patent
Bathurst Mine Skinner Township (52N/07SW)	Au	Reserves: 80 000 tons of 0.587 opt Au	Sabina Resources Ltd.	Energy Mines and Resources Canada 1989	Leased
Berens River Mine (Golsil, Zahavy) (53C/13SE)	Au, Ag, Pb, Zn	Reserves: No. 1 Zone - 75 000 tons of 0.1 - 0.2 opt Au, 4.0 – 5.0 opt Ag No. 3 Zone - 982 213 tons of 0.26 opt Au, 4.8 opt Ag, 0.77% Pb, 1.12% Zn (713 249 tons indicated, 268 964 tons inferred) at 0.15 opt Au cut-off to 750 metre level	Wolfden Resources Inc.	MDIR AF - (Bevan 1983)	Staked Claim
Bluffy Lake (52K/14SE)	Fe	Reserves: 21 000 000 tons at 22.86% Fe	Unknown	Prelim. Map P.1199	Licence of Occupation
Borland Lake (53D/16NE)	Ag, Au	Probable Reserves: 502 412 tons of 8.09 opt Ag and 0.02 opt Au	Crown	Massive Resources Ltd. Preliminary Prospectus - August 6, 1987	Open

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Buffalo Red Lake Heyson Township (52N/04SW)	Au	Reserves: 421 728 tonnes of 0.139 opt Au drill indicated in 1980	Claude Resources Inc.	MDIR	Patent
Cochenour Willans Mine Dome Township (52N/04SW)	Au	Reserves: Proven and probable 173 000 tons of 0.51 opt Au, possible reserves 274 000 tons of 0.59 opt Au	Goldcorp Inc.	NM - Dec. 12, 1994 p.7	Patent, Licence of Occupation
Cole Gold Mine Ball Township (52M/01SE)	Au	Reserves: 119 780 tons of 0.41 opt Au probable and indicated (Wilton 1973)	The Cole Gold Mines Ltd.	AF	Patent, Licence of Occupation
Consolidated Marcus Dome Township (52N/04SW)	Au	Reserves: 60 000 tons of 0.18 opt Au	Goldcorp Inc.	Energy Mines and Resources Canada 1989	Patent
Copper Lode A – Rexdale Group Prospect (52K/15NW)	Cu, Ag	Reserves: 236 424 tons of 1.94% Cu, 1.22 opt Ag or 425 612 tons of 1.56% Cu, 0.98 opt Ag or 854 007 tons of 1.01% Cu, 0.57 opt Ag	P. English	AF MP152	Staked Claim
Copper-Lode D Belanger Township (52K/15NW)	Cu, Zn	Reserves: 36 000 tons of 0.26% Cu, 7.58% Zn	Noranda Mining and Exploration Inc.	AF	Leased
Copper-Lode E Belanger Township (52K/15NW)	Cu, Ag	Reserves: 160 000 tons of 8.28% Zn, 1.02% Cu, 0.39 opt Ag	Noranda Mining and Exploration Inc.	AF	Leased
Dixie Creek (52K/13SE)	Au	Reserves: 417 000 tons of 0.126 opt Au	Perry English	AF	Staked Claim
Dixie 3 Prospect (52K/14NW)	Cu, Zn	Reserves: 91 000 tons of 10.0% Zn, 1.0% Cu	Noranda Mining and Exploration Inc.	AF	Leased - Mining Rights Only, Staked Claim
Dixie 18 Prospect (52K/14NW)	Zn	Reserves: 110 000 tons of 0.5% Cu, 12.5% Zn	Noranda Mining and Exploration Inc.	AF	Staked Claim
Grassett Prospect Earngey Township (52N/02SE)	Au	Reserves: 78 295 tons of 0.22 opt Au (Part of the Hill-Sloan-Tivy Vein)	Lac Properties Inc.	Energy Mines and Resources Canada 1989	Patent
Griffith Mine (52K/14SW)	Fe	Reserves: 120 000 000 tons of 29% Fe	Unknown	GR82	Patent
Hasaga Mine Heyson Township (52N/04SW)	Au	Reserves: C Block (below 1800 feet) - 200 203 tons of 0.192 opt Au Stopes - 41 430 tons of 0.104 opt Au Pillars - 6 365 tons of 0.134 opt Au	Lac Properties Inc.	GR56	Patent

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Hill-Sloan-Tivy Earngey Township (52N/02SE)	Au	Reserves: 296 000 tons of 0.219 opt Au (Grassett Prospect Reserves may be included in total)	Unknown	AF	Patent
Horseshoe Island (52N/08NW)	Au	Reserves: 893 508 tons of 0.14 opt Au	P. English, D. Patrie	Northwest Prospector, March/April 1990, p.27	Staked Claim
Howey Mine Heyson Township (52N/04SW)	Au	Reserves: 780 000 tons of 0.08 opt Au	Teck Corporation	Energy Mines and Resources Canada 1989	Patent, Licence of Occupation
Jackson-Manion Mine Dent Township (52N/02SE)	Au	Reserves: 40 000 tons of 0.5 opt Au	Orofino Explorations Ltd.	NM - March 14, 1985, p.21	Patent
Joy - New Zone (Diamond Willow Zone, Creek Zone) (52K/14NW)	Cu, Zn	Reserves: 300 000 tons of 4% combined Cu-Zn	Noranda Mining and Exploration Inc.	AF	Staked Claim
Kesaka Lake (52K/16NW)	Fe	Reserves: 312 500 000 tons of 31.1% Fe to a depth of 100 feet	Crown	ODM Annual report Vol. 48, pt. 8, p. 1-43	Open
Laverty (Thrall) Heyson Township (52N/04SW)	Au	Reserves: Speculative reserves from the Diabase dike zone: - 329 000 tons of 0.08 opt Au or 75 000 tons of 0.15 opt Au	Unknown	AF	Patent
Lingman Lake (53F/15SW)	Au	Reserves: 1 172 753 tons of 0.20 opt Au in all zones at 5.0 foot minimum width and a cut-off grade of 0.08 opt Au (McPhee, 1989)	Cool Minerals Inc.	AF	Patent
May-Spiers Ball Township (52M/01SE)	Au	Reserves: 30 000 tons of 0.09 opt Au	Goldcorp Inc.	AF	Staked Claim
McCombe (Root Lake) (52J/13NE)	Lithia	Reserves: 2.3 million tons of 1.3% Lithia to the 500 foot level	Unknown	MP90	Patent, Licence of Occupation
McFinley Mine Bateman Township (52N/04SE)	Au	Preliminary Reserves: 890 000 tons of 0.21 opt Au	McFinley Red Lake Mines Ltd.	CMH	Patent, Licence of Occupation
Mount Jamie Todd Township (52M/01SE)	Au	Reserves: Main Zone - 47 048 tons of 0.425 opt Au No. 2 Shaft area - 25 360 tons of 0.37 opt Au	Jamie Frontier Resources Inc.	AF	Patent
My-Ritt (Coin Lake) Heyson Township (52N/04SW)	Au	Unknown	My-Ritt Red Lake Gold Mines Ltd.	OFR 5558	Patent

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Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
New Faulkenham Mines Ltd. (Faulkenham Lake) Baird Township (52K/13NW)	Au	Reserves: 15 000 tons of 0.428 opt Au ($15.00 at $35.00 per ounce Au - Holbrooke, 1958)	Claude Resources Inc.	AF	Patent
North Spirit Lake (Crown Trust) (53C/07NW)	Fe	Reserves: 1.3 million tons per vertical foot of 33.94% Fe	Unknown	ODM Annual Report Vol.47, Pt. 7, p.44-78 GR150	Patent, Leased
Northgate Prospect Earngey Township (52N/02SE)	Au	Reserves: 64 600 tons of 0.28 opt Au	Perry English/ John Green	AF	Staked Claim
Ogani Lake (52K/15NE)	Fe	Reserves: 100 000 000 tons of 21.6% Fe	Crown	AF	Open
Papaonga Lake (52K/16NE)	Fe	Reserves: 13 500 000 tons of 31.06% Fe	Crown	MDIR	Open
Red Crest (Red Summit) Todd Township (52M/01SE)	Au	Reserves: 47 439 tons of 0.269 opt Au (uncut grade) - Horwood, 1945 38 000 of 0.3 opt Au	Claude Resources Inc.	NM - March 14, 1985, p.21 DoM Annual Report vol. 49, pt. 2, 1940	Patent
Redaurum Baird Township (52N/04SW)	Au	Possible Reserves: 14A Zone - 243 750 tons of 0.22 opt Au - 26 250 tons of 0.20 opt Au No. 2 Zone - 137 500 tons of 0.18 opt Au No. 3 Zone - 102 500 tons of 0.18 opt Au Camp Zone - 24 750 tons of 0.13 pt Au	Sabina Resources Ltd. (80%) and Redaurum Ltd. (20%)	AF	Patent
Richardson (Kostynuk Bros. Mine) (52N/09SW)	Au	Reserves: 700 000 tons of 0.2 opt Au inferred reserves	Unknown	OFR 5835	Patent
Rowan Todd Township (52M/01SE)	Au	Reserves: 10 900 tons of 0.657 opt Au ($23.00 a ton at $35.00 per ounce)	Goldcorp Inc.	AF	Patent
Sanshaw (Whitehorse Island) Dome Township (52N/04SW)	Au	Reserves: 175 000 tons of 0.20 opt Au	Eugenic Corp.	NM - June 11, 1953	Patent, Licence of Occupation
Setting Net Lake (53C/13SE)	MoS_2	Reserves: 100 000 000 tons of 0.09% MoS2	Crown	MDIR NM - March 23, 1973	Open
Sol-D'Or Honeywell Township (52N/07SE)	Au	Reserves: 8 565 tons of 0.57 opt Au	J. Williamson	Energy Mines and Resources Canada 1989	Staked Claim

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Springpole Lake Prospect (52N/08NW)	Au	Reserves: Portage Zone - 7.9 million tons of 0.07 opt Au - 27 million tons of 0.035 opt Au including 4 million tons of 0.091 opt Au and 405 000 tons of 0.14 opt Au	Gold Canyon Resources Inc.	OFR 5835	Patent, Staked Claims
Starratt-Olsen Mine Baird Township (52K/13NW)	Au	Reserves: 15 000 tons of 0.45 opt Au	Claude Resources Inc.	NM - July 26, 1973 MDIR	Patent
Trout Bay Zinc Pit Zone Mulcahy Township (52M/01SE)	Zn, Cu, Pb, Ag, Au	Reserves: West Zone - 13 776 tons of 4.75% Zn, 0.68% Cu, 0.94 opt Ag East Zone - 124 760 tons 7.86% Zn, 1.5% Cu, 0.24% Pb, 1.7 opt Ag, 0.007 opt Au	Goldcorp Inc.	MP147 Prelimary Map P.567 MDIR	Patent (Mining Rights Only), Leased (Mining Rights Only, Licence of Occupation
Uchi Mine Earngey Township (52N/02SE)	Au	Reserves: 214 000 tons of 0.147 opt Au	Lac Properties Inc.	Energy Mines and Resources Canada 1989	Patent
Wilmar Mine Dome Township (52N/04SW)	Au	Reserves: Quoted from Durocher et al 1987 unless indicated otherwise Diorite Dike Zone - 140 000 tons of 0.21 opt Au East Breccia Zone - 31 500 tons of 0.32 opt Au (Proven) - 50 500 tons of 0.25 opt Au (Probable) - 1 777 000 tons of 0.24 opt Au (Possible) Carbonate Zone - 25 000 tons of 0.17 opt Au (Probable) - 7 500 tons of 0.15 opt Au (Possible) West Granodiorite Zone - 3.15 to 4.5 million tons of 0.076 to 0.131 opt Au (EMR Canada, 1989) Granodiorite Zone - 5 700 000 tons of 0.10 to 0.15 opt Au	Goldcorp Inc.	OFR 5558 Energy Mines and Resources Canada 1989	Patent
Woco Vein Earngey Township (52N/02SE)	Au	Reserves: 21 263 tons of 0.80 opt Au	St. Jude Resources Ltd.	AF	Staked Claims
Young, H.G. Mines Ltd. Balmer Township (52N/04SW)	Au	Reserves: 270 000 tons of 0.31 opt Au	Placer Dome North America	OFR 5558	Patent

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Ontario

Ontario Geological Survey
Regional Resident Geologist Program

Red Lake Regional Resident Geologist (Kenora District)—2001

by

P. Hinz, C. Ravnaas and A. Racul

2002

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RED LAKE REGIONAL RESIDENT GEOLOGIST (KENORA DISTRICT)—2001

P. Hinz[1] C. Ravnaas[1] and A. Raoul[2]

[1]District Geologist, Kenora District, Resident Geologist Program, Ontario Geological Survey

[2]District Support Geologist, Kenora District, Resident Geologist Program, Ontario Geological Survey

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INTRODUCTION

Dimension, monument and decorative stone continued to be produced and marketed from 5 quarries in the Kenora District in 2001. No metallic mineral production was recorded in the district. A total of 6 companies and 8 prospectors conducted mineral exploration and prospecting programs on 20 properties in the district. Avalon Ventures Ltd. and Emerald Fields Resource Corp. continued advanced market analysis projects on their Separation Rapids rare metal projects. Platinum group metals were the focus of 9 exploration projects, while 5 programs targeted rare-metals such as tantalum. Four projects focused on gold and the remaining four were split between cobalt, base metal and soapstone.

MINING ACTIVITY

Production continued from 4 granite quarries and one soapstone quarry. The quarries mentioned below are keyed, with letters in parentheses, to Figure 1.

Dimension and Monument Stone

NELSON GRANITE LTD. (A DIVISION OF GRANITE MONUMENTS LTD.)

Nelson Granite Ltd. continued year-round production from 4 stone quarries, in the Kenora District, during 2001. Production figures for the 4 quarries are as follows: 7080 m^3 (250 000 ft^3) of "Vermilion Pink" from their Vermilion Bay Quarry (A); 2549 m^3 (90 016 ft^3) of "Pine Green" from the Forgotten Lake East Quarry (B); 680 m^3 (24 014 ft^3) of "Red Deer Brown" stone from the Red Deer Lake Quarry (C); and a total of 105 m^3 (3708 ft^3) of stone marketed under the name "Shepody" was produced from their Shepody Quarry (D) (N. Nelson, Nelson Granite Ltd., personal communication, 2002).

Decorative Stone

THORGRIMSON STONE ART INC.

In 2001, **Thorgrimson Stone Art Inc.** removed approximately 20 tons of soapstone from their Eagle Lake Quarry (E). The soapstone is currently being sold for carving purposes to the Northwest Territories, Nunavut, the United States and across Canada (P. Thorgrimson, Thorgrimson Stone Art, personal communication, 2002).

EXPLORATION ACTIVITY

Table 1. Exploration activity in the Kenora District in 2001.

Abbreviations

AEM	Airborne electromagnetic survey
AM	Airborne magnetic survey
DD	Diamond drilling
DDH	Diamond drill hole(s)
DGP	Down-hole geophysics
GC	Geochemical survey
GEM	Ground electromagnetic survey
GL	Geological Survey
GM	Ground magnetic survey
GRA	Ground radiometric survey
Grav	Gravity survey
HLEM	Horizontal loop electromagnetic survey
Lc	Linecutting
Met	Metallurgical testing
OPAP	Ontario Prospectors Assistance Program
PEM	Pulse electromagnetic survey
PGM	Platinum group metals
Pr	Prospecting
RES	Resistivity survey
Samp	Sampling (other than bulk)
Seismic	Seismic survey
SP	Self-potential survey
Str	Stripping
Tr	Trenching

No.	Company/Individual (Occurrence or Property)	Exploration Activity	Commodity	Resources/Results
1	Atikwa Minerals Ltd. (Contact Bay Property)	GL, Pr, Samp	PGE, Cu, Ni	Sampling encountered 3 areas of anomalous mineralization. Combined Pt+Pd+Au values ranged as high as 1332 ppb and included 2.35% Cu.(*press release*, Atikwa Minerals Ltd., October 2001).
2	Atikwa Minerals Ltd. (Fortune and Rex properties)	AEM, AM, GL, Samp	PGE, Cu, Ni, Au	Sampling of known mineralized showings returned values up to 6.2% Cu and 1.84 g/t Au, 8.7% Cu and 0.72 g/t Au, and 1.59% Cu and 2.1 g/t Au (*press release*, Atikwa Minerals Ltd., October 2001).
3	Atikwa Minerals Ltd. (Mulcahy gabbro property)	GL, Pr, Samp	PGE, Cu, Ni	Sampling program collected 832 samples, the highest assay encountered was 155 ppb Pt+Pd (*press release*, Atikwa Minerals Ltd., October 2001).
4	Atikwa Minerals Ltd. (Norpax Deposit)	AEM, AM, GL, Pr, Samp	PGE, Cu, Ni	Sampling of Norpax dump material assayed 7.0 g/t Pd and 16.9 g/t Pd (*press release*, Atikwa Minerals Ltd., October 2001).
5	Atikwa Minerals Ltd. (Osbourne Bay property)	GL, Pr, Samp	PGE, Cu, Ni	Mineralization identified over an area of 2250m by 1250 m. Elevated Pt+Pd+Au encountered (*press release*, Atikwa Minerals Ltd., October 2001).
6	Avalon Ventures Ltd. (Big Whopper deposit)	DD, Samp, Met	Li, Cs, Rb, Ta	Indicated and inferred resource of 11.6 million t grading 1.34% Li_2O and 0.30% Rb_2O (*Canadian Mines Handbook* 2000–01, p.48).
7	Avalon Ventures Ltd. (Raleigh Lake property)	DD, Str, Tr, Samp	Li, Cs, Rb, Ta	Drilling intersected tantalum-bearing pegmatite dikes. Assays ranged from 0.017% to 0.027% Ta_2O_5 (*press release*, Avalon Ventures Ltd., December 28, 2001).

No.	Company/Individual (Occurrence or Property)	Exploration Activity	Commodity	Resources/Results
8	Canmine Resources Ltd. (Werner Lake cobalt deposit)	DD, Samp, Met	Co	Reserves and resources total 232 316 tonnes grading 0.36% Co and 0.28% Cu. Additionally, 869 378 tonnes not included in the above resource are inferred resources of 0.29% Co and 0.28% Cu (Canmine Resources Ltd., 2001 Annual Report) Drilling program conducted to increase the resource base. New cobalt mineralization was intersected. More drilling is required to better define high-grade cobalt lenses (B. Ferreira, Canmine Resources Ltd., personal communication, February 2002).
9	Champion Bear Resources Ltd. (Eagle Rock Lake property)	DD, Samp, Met	PGE, Cu, Ni, Au	Metallurgical testing returned a head grade of 0.65% Cu, 0.40 g/t Pd, 0.25 g/t Pt, 0.25 g/t Au and 8.0 g/t Ag (*press release*, Champion Bear Resources Ltd., February 28, 2001).
10	Champion Bear Resources Ltd. (Separation Rapids property)	DD, Samp	Li, Cs, Rb, Ta	Best assays on Marko's pegmatite included 402 ppm Ta_2O_5 over 4.7 m (*press release*, Champion Bear Resources Ltd., April 18, 2001).
11	Cousineau, L., Cousineau R. and Desjardins, K. (Halkirk soapstone property)	GL, Str, Pr, Samp	Soapstone	Property visited by Kenora District Geologist, see property write-up in this report.
12	Emerald Fields Resource Corp. (Big Mack property)	DD, Str, Samp, Met	Li, Cs, Rb, Ta	Estimated resource of 300 000 tonnes grading 30.5% petalite (Breaks and Tindle 2000).
13	Etherington, R. and Thompson, L. (Etherington property)	Pr, Samp	Au	No results available
14	Glatz, A. (Keikewabik Lake property)	Pr, Samp	Zn, Pb, Au	Property visited by Kenora District Geologist, see property write-up in this report.
15	Glatz, A. (Langton Township property)	Pr, Samp	PGE, Cu, Ni, Au	No results available
16	Glatz, A. (Tustin Township properties)	Pr, Samp	PGE, Cu, Ni, Au, Li, Cs, Rb, Ta	No results available
17	Glatz, A. and Kozowy, A. (Contact Bay property)	Pr, Samp	PGE, Cu, Ni	No results available
18	Glatz, A. and Riives, I.J. (Echo Township property)	Pr, Samp	Au	No results available
19	Johnson, S. and Bond, J. (Mile Lake property)	Pr, Samp	Au	No results available
20	Nuinsco Resources Limited (Rainy River property)	AEM, AM, GEM	PGE, Cu, Ni, Au	The ground magneto-telluric (MT) survey identified several anomalies coincident with VMS alteration anomalies.
21	Riives, I.J. (New Millenium property)	Pr, Samp	Au, Cu	No results available

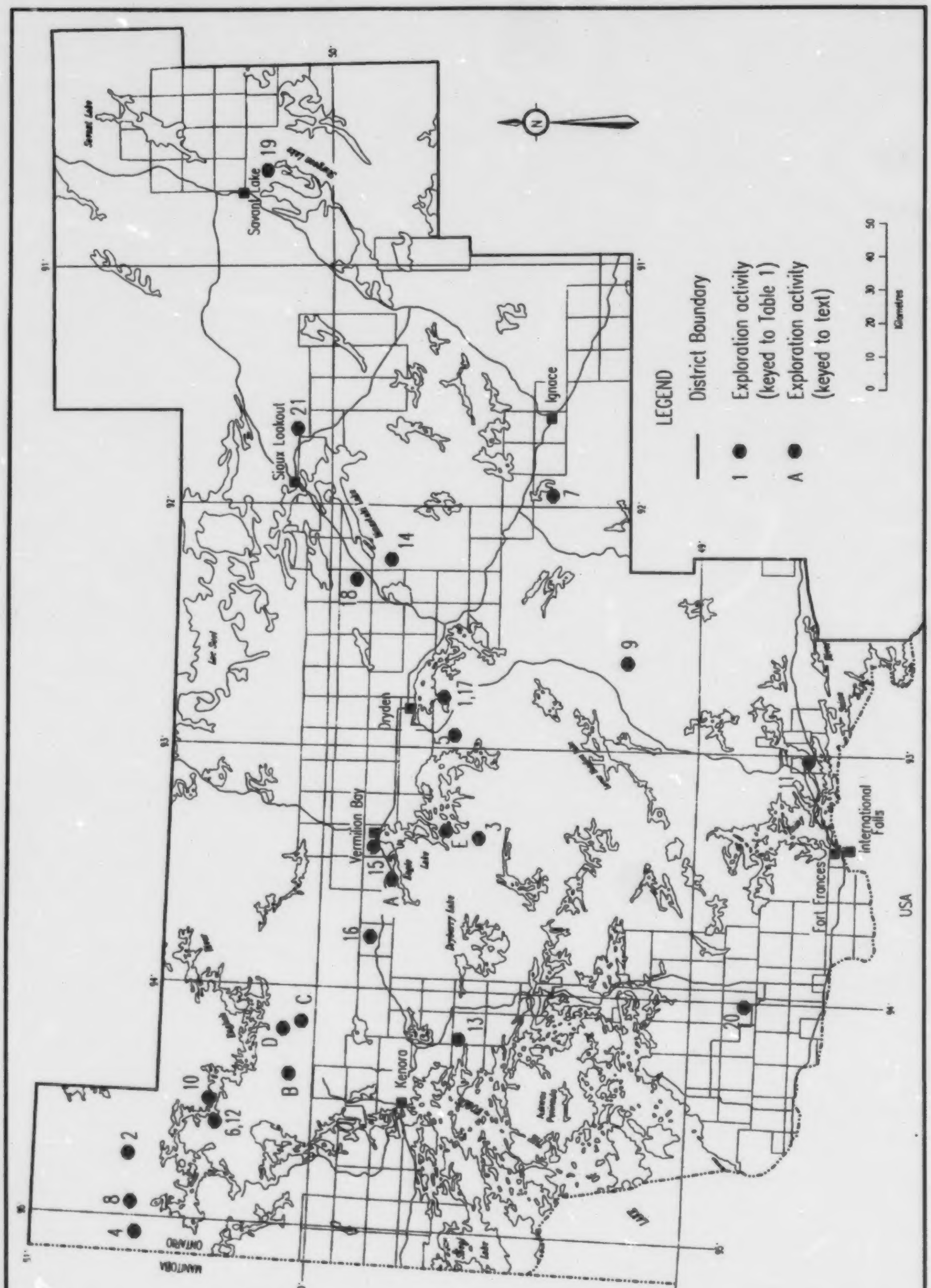

Savant Lake
Sturgeon Lake
Savant Lake
19
Sioux Lookout
21
Ignace
7
14
18
Lac Seul
9
Dryden
1,17
5
Vermilion Bay
15
A
E
3
Eagle Lake
16
Dryberry Lake
C
D
B
10
6,12
2
8
4
Kenora
13
20
11
International Falls
Fort Frances
USA
MANITOBA
ONTARIO
50°
49°
91°
92°
93°
94°
95°
LEGEND
District Boundary
1 ● Exploration activity (keyed to Table 1)
A ● Exploration activity (keyed to text)
0 10 20 30 40 50
Kilometres
N

Figure 1. Exploration and quarry activity in the Kenora District in 2001.

RESIDENT GEOLOGIST PROGRAM STAFF AND ACTIVITIES

The Kenora office was staffed by P. Hinz, District Geologist (April to present); C. Ravnaas, District Geologist; A. Raoul, Acting District Geologist (January to April), District Support Geologist (April to present); J. Lowen, B. Hayberg and R. Peterson, summer assistants.

Kenora Resident Geologist Program was present at the following events: the Prospectors and Developers Association of Canada Convention in Toronto; the Northwestern Ontario Mines and Minerals Symposium in Thunder Bay; the Institute on Lake Superior Geology Annual Meeting in Madison, Wisconsin; the Manitoba Mining and Minerals Convention in Winnipeg, Manitoba; the Ontario Exploration Geoscience Symposium in Toronto, and the Superior PGE 2001, Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Geological Society Field Conference in Thunder Bay.

Staff attended two tours conducted in the Kenora District: the Entwine Lake Intrusion presented by J. Arnold, Laurentian University and G. Beakhouse, Ontario Geological Survey; and the Islet Lake Stock tour presented by A. Raoul and G. Beakhouse, Ontario Geological Survey. Kenora staff presented two field trips on the geology of the Kenora area.

During 2001, the staff of the Kenora District office conducted 26 property visits, inspections and examinations (*see* Table 2, Figure 2). The District office handled 565 personal consultations and 747 telephone inquires.

Property and Field Examinations

Properties visited by staff of the Kenora District office in 2001 are listed and described below. Primary authorship for the property and field examination descriptions are in parentheses following the heading title. North American Datum (NAD 27) is the datum of all global position satellite coordinates presented.

Table 2. Property and field examination conducted by the Kenora District Geologists in 2001.

Number (keyed to Figure 2)	Property / Occurrence
1	Avalon Ventures Ltd. – Big Whopper deposit
2	Canmine Resources Ltd. – Werner Lake deposit
3	Champion Bear Resources Ltd. – Eagle Rock prospect
4	Cousineau Brothers – Chappie Island property
5	Cousineau Brothers – Cousineau soapstone occurrence
6	Cousineau Brothers – Halkirk lamprohyre dikes
7	Cousineau Brothers – Halkirk PGE property
8	Glatz, A. – Glatz occurrence
9	Glatz, A., Kozowy, A. – Keikewabik Lake occurrence
10	Huston, C. – Beidelman Bay occurrence
11	Nelson Granite – Forgotten Lake East Quarry
12	Nelson Granite – Red Deer Lake Quarry
13	Nelson Granite – Shepody Quarry
14	Plomp, F. – Plomp Farm occurrence
15	Riives J. – Alcona gold prospect

Number (keyed to Figure 2)	Property / Occurrence
16	Riives J. – New Millennium ocurrence
17	Staff examination – Denmark Lake intrusions
18	Staff examination – Entwine Lake Intrusion
19	Staff examination – Gauthier–Nelson occurrence
20	Staff examination – Islet Lake stock
21	Staff examination – Jackfish–Weller intrusions
22	Staff examination – Laval Township lamprophyre dikes
23	Staff examination – North Kaiarshons Road VMS property
24	Staff examination – Pike Lake Intrusion
25	Staff examination – Segise Road granite
26	Woitowicz, M. – Peak Lake occurrence

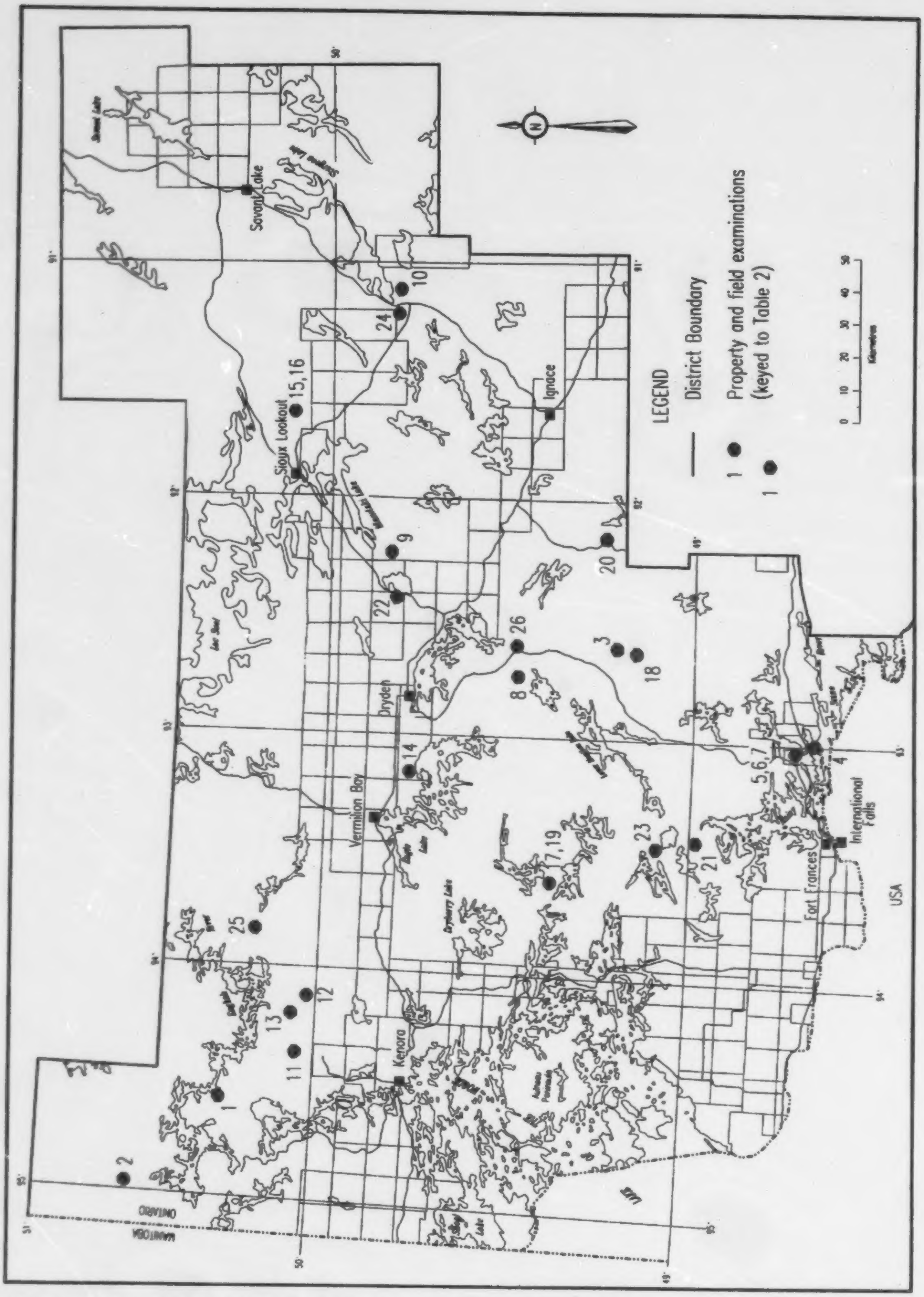

Savant Lake
Sturgeon Lake
Sioux Lookout
Ignace
Dryden
Vermilion Bay
Kenora
Fort Frances
International Falls
USA
MANITOBA
ONTARIO
Lac Seul
Eagle Lake
Dryberry Lake
Lake of the Woods
LEGEND
District Boundary
Property and field examinations (keyed to Table 2)
Kilometres
0
10
20
30
40
50
1
2
3
4
5,6,7
8
9
10
11
12
13
14
15,16
17,19
18
20
21
22
23
24
25
26
50°
51°
49°
91°
92°
93°
94°
95°

Figure 2. Property and field examinations conducted in the Kenora District in 2001.

BEIDELMAN BAY OCCURRENCE (C. RAVNAAS)

The patent lands that cover the Beidelman Bay occurrence became open for prospecting and staking on June 1st, 2001. Red Lake prospector Carl Huston subsequently staked the crown land covering the occurrence. The Beidelman Bay occurrence is located approximately 5 km northeast of the hamlet of Silver Dollar, in the Valora Lake Area. Silver Dollar is located 60 km north of the town of Ignace. Access is provided via the Mattabi Mine Road and a network of logging roads.

Table 3. Exploration work and studies conducted on the Beidelman Bay Intrusion and Beidelman Bay occurrence.

Year	Company / Author	Type of Work	Publication	Work Location related to Trench Areas
Pre 1966	Unknown	Tr	Nil	West trench area
1966-68	Steep Rock Iron Mines Ltd.	DD 4 to 108 m (BB1-4), SA, Tr	AF 52G14SE 12A-1	East trench area
1967	Steep Rock Iron Mines Ltd.	DD 14 to 554 m (BB5-18), SA	AF 52G14SE 11C-1	West trench areas
1967	Steep Rock Iron Mines Ltd.	Report, GL, GM, IP, SP, GC	AF 52G14SE 79	Both trench areas
1969	Noranda Inc.	GM, GEM	AF 52G14SE 74A-1	North of trench areas
1970	Noranda Inc.	IP	AF 52G14SE 65	North of trench areas
1970	Noranda Inc. (Gauthier Option)	DD 2 to 290 m (GO 70-1,70-2), SA	AF 52G14SE 26	South of west trench area near Mattabi Road
1970	Noranda Inc.	DD 3 to 530 m (BB70-1, 70-4, 70-5), SA	AF 52G14SE 29A-1, 32	North and adjacent to west trench area
1971-73	Consolidated Morrison	DD 12 to 2137m (B1-B3, BB1-BB9), GM, GEM, IP, RES	AF 52G14SE 21, 42	North of trench areas over water of Sturgeon Lake
1972	Noranda Inc.	GL, Report	AF 52G14SE 48B-1	North of trench areas
1972	Corridor Mines Ltd.	GEM, GM	AF 52G14SE 66	East of trench areas
1974	Friske, P.	GL, SA Report	BSc Thesis	Both trench areas
1974	Trowell, N.F.	GL, Report	OGS Geological Report 114	Beidelman Bay Intrusion
1981	Poulson, K.H. and Franklin, J.M.	GL, SA, Report	GSC Current Research 81-1A	Beidelman Bay Intrusion
1983	Trowell, N.F.	GL, Report	OGS Geological Report 224	Beidelman Bay Intrusion
1984	Norminex Ltd.	AEM, AMAG	52G14SE 73	Beidelman Bay Intrusion
1988	OGS Staff	Compilation of exploration	GDIF 439	Valora Lake area
1990	OGS	AEM, AMAG	Map 81493	Beidelman Bay Intrusion
2000	Galley, A., van Breeman, O., and Franklin, J.M.	GL, SA, age dating, Report	Camiro project 94E07	Beidelman Bay Intrusion

AF = assessment file; GDIF = Geological Data Inventory Folio. See Table 1 for list of "Type of Work" abbreviations used.

The Sturgeon Lake–Savant Lake airborne electromagnetic and magnetic survey maps (Ontario Geological Survey 1990) cover the entire area. The maps show that a majority of the Beidelman Bay Intrusion is covered by magnetic highs. The trenches are located at a magnetic low and high boundary. This low could be a result of the xenolithic and brecciated nature of the rocks. A ground magnetic survey by Steep Rock Iron Mine Ltd. shows similar results (Kenora Assessment File 52G/14SE 0079).

The Beidelman Bay Intrusion is situated in the south Sturgeon Lake volcanic group, part of the central Wabigoon Subprovince. The geological setting and rock descriptions have been revised by studies conducted on the intrusion (*see* Table 3). A compilation of these studies by this author has provided a comparison of rock types and mineralization.

Previous mapping by Galley, van Breeman and Franklin (2000), Trowell (1983), Poulson and Franklin (1981), Trowell (1974), Friske (1974) and Steeprock Iron Mines Ltd. (Kenora Assessment File 52G/14SE 0079) provides different descriptions of the rock types of the Beidelman Bay Intrusion. Galley, van Breeman and Franklin (2000) state: "The Beidelman Bay intrusion includes five different magmatic phases that vary in morphology, composition and timing relative to each other." According to Galley, van Breeman and Franklin (2000), the earliest phase is a "… xenolithic amphibole-bearing quartz diorite to tonalite…" intruded by "…quartz porphyritic dikes…" and

> Approximately 75 percent of the Beidelman Bay intrusion is a fine- to medium-grained biotite trondhjemite…. The fourth… phase includes a series of intrusive and hydrothermal breccias and accompanying plagioclase-quartz and quartz-plagioclase porphyritic dikes…. The latest … phase consists of two north-north-east-striking swarms of felsic to intermediate dikes.

Trowell (1974) considered the intrusion to comprise an early granitoid phase and a later porphyritic phase. The granitoid phases comprise granodiorite, trondhjemite and granite. The porphyritic phases comprise quartz porphyry and quartz-feldspar porphyry. Two types of breccia were identified: a breccia with volcanic xenoliths set in a granitoid matrix, and an intrusive breccia with felsic intrusive xenoliths set in a gray siliceous matrix. This intrusive breccia has been described as a hydrothermal breccia by other authors. The breccia zone is 2000 m long, with widths up to 200 m.

The different intrusive phases exhibit varying degrees of alteration. The mafic volcanic clasts within the volcanic-xenolithic trondhjemite and hydrothermal breccia have been altered to chlorite and biotite schist. Silicification, minor carbonatization and tourmalinization is superimposed upon sericitic rocks (Trowell 1974). Blue quartz porphyroblasts were developed in all rock types affected by silicification. Trowell (1974) states: "The intensity of the blue colour of these quartz grains seems to reflect the intensity of shearing; the more highly the rocks are sheared, the more intense the blue of the quartz grains."

All phases of the intrusion have undergone upper greenschist to lower amphibolite regional metamorphism and are tilted steeply to the north (Galley, van Breeman and Franklin 2000). This author attempted to examine and sample all rock types located near the trench areas. Steeprock Iron Mines Ltd. (Kenora Assessment File 52G/14SE 0079) adequately described the dimensions of the trenches.

Seventeen grab samples were collected during this property visit. Table 4 presents the major element geochemistry. Table 5 presents descriptions, locations and selected metal analysis of samples. Figures 3 and 4 illustrate the rock types, sample and trench locations.

The Beidelman Bay occurrence comprises two zones of subeconomic mineralization with average grades of 0.2% Cu, 0.03% Mo, up to 400 ppb Au and minor Zn and Ag (Galley, van Breeman and Franklin 2000).

Poulson and Franklin (1981) collected sixty samples for metal analysis from the intrusion, concentrating on the Beidelman Bay occurrence. Mineralized trondhjemite returned the highest Cu and Zn values, ranging up to 13 000 and 600 ppm, respectively. The remaining rock types returned low metal values.
Trowell (1974) describes the mineralization of the Beidelman Bay occurrence:

> The eastern mineralized area consists of disseminated pyrite and chalcopyrite, and locally pyrrhotite, in a zone of silicified granodiorite. The unaltered granodiorite surrounding this silicified granodiorite zone contains local concentrations of magnetite, pyrite, chalcopyrite, and rare pyrrhotite.
>
> The western mineralized area also is associated with a 500-foot wide zone of silicified granodiorite; this zone has a gradational (?) contact with the unaltered granite to the north and an intrusive contact with the older breccia to the south. The mineralization consists of disseminated pyrite, pyrrhotite, chalcopyrite, and minor molybdenite and bornite.

Table 4. Major element geochemistry of samples collected from the Beidelman Bay occurrence.

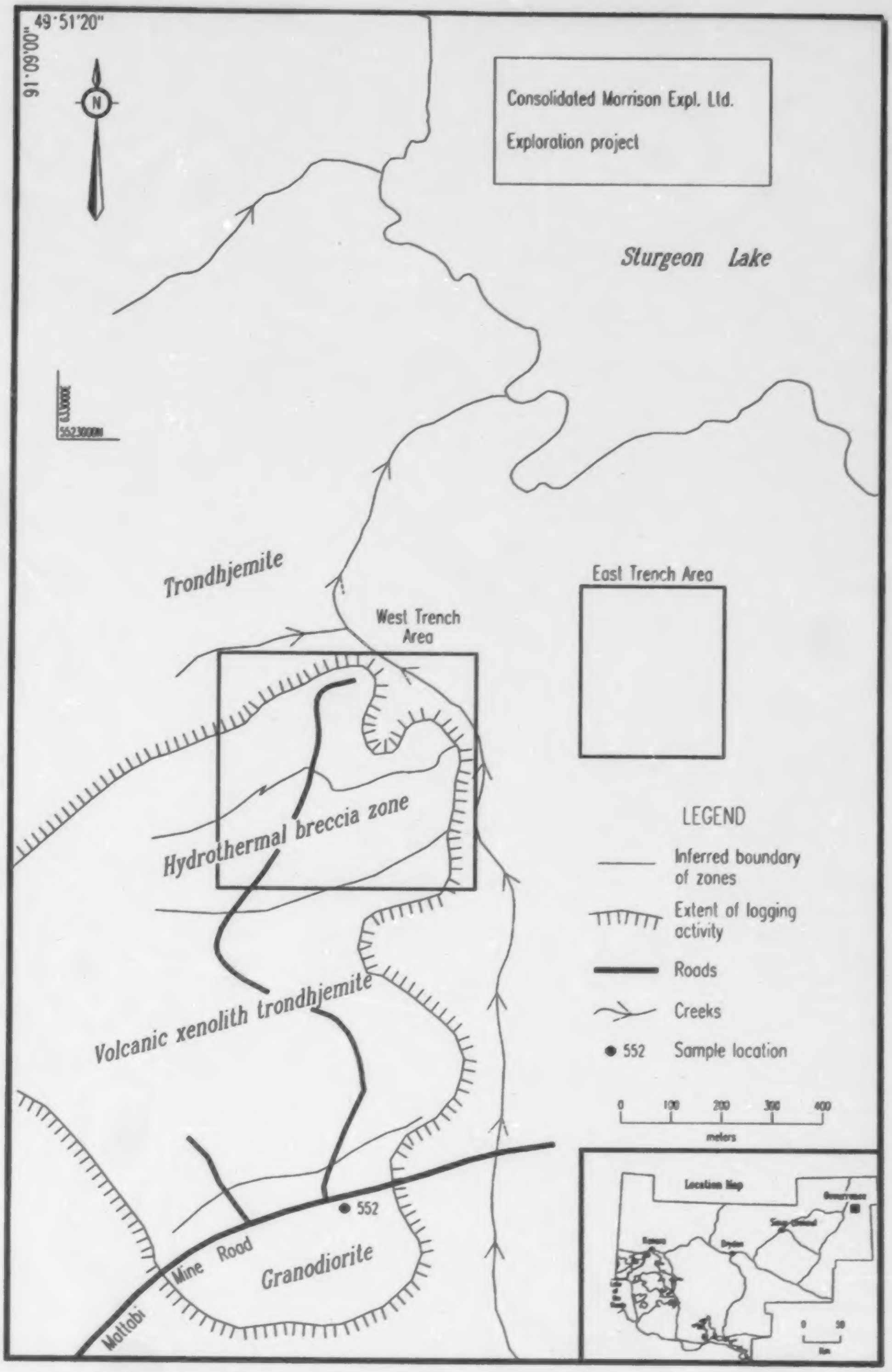
Sample	Rock Type	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	MgO %	CaO %	Na_2O %	K_2O %	MnO %	P_2O_5 %	TiO_2 %	LOI %	Total %
541	Hydrothermal breccia	67.15	14.08	6.25	1.86	3.21	2.67	1.39	0.06	0.24	0.92	2.94	100.77
542	Hydrothermal breccia	67.04	14.00	5.96	1.80	3.07	2.43	1.57	0.06	0.16	0.72	3.32	100.13
542A	Trondhjemite	67.35	14.55	5.83	1.43	2.72	3.42	1.29	0.05	0.11	0.56	2.86	100.18
543	Breccia matrix	73.76	12.00	4.53	0.92	1.77	2.78	1.18	0.03	0.11	0.50	2.33	99.90
544	Quartz vein	88.98	4.61	2.76	0.46	0.50	0.52	0.74	0.02	0.05	0.18	1.43	100.25
545	Feldspar porphyry	69.87	16.13	2.75	0.77	3.61	4.77	0.97	0.03	0.07	0.28	1.22	100.46
546	Altered trondhjemite	84.22	9.89	0.84	0.05	0.13	4.50	0.79	0.01	0.03	0.22	0.56	101.26
547	Blue quartz "eye" granite	72.67	12.78	5.11	0.35	1.05	3.57	1.81	0.02	0.07	0.40	2.44	100.27
548	Hyrdothermal breccia ?	63.84	14.61	8.26	2.52	3.55	1.92	1.73	0.07	0.17	0.77	3.25	100.68
549	Plagioclase-quartz porphyry	75.48	12.36	3.83	0.12	0.85	4.56	2.32	0.05	0.03	0.27	0.86	100.74
550	Hydrothermal breccia	70.31	13.61	6.11	1.13	1.26	2.78	1.88	0.04	0.13	0.63	2.39	100.28
551	Hydrothermal breccia	66.82	14.18	7.04	1.27	1.67	3.56	1.35	0.05	0.17	0.79	2.72	99.63
551A	Trondhjemite	67.36	14.54	6.87	1.47	1.49	3.42	1.62	0.06	0.13	0.65	2.64	100.25
552	Blue quartz granodiorite	66.48	14.48	5.88	1.00	2.61	2.60	2.92	0.08	0.11	0.63	3.15	99.95
553	Trondhjemite	70.65	14.74	2.91	0.81	0.98	4.85	2.18	0.01	0.06	0.26	1.76	99.22
554	Altered trondhjemite	69.43	14.59	3.56	0.83	1.60	3.09	3.11	0.03	0.06	0.24	3.12	99.65
555	Trondhjemite	67.82	16.05	3.15	0.97	3.30	4.66	1.48	0.03	0.07	0.29	2.08	99.89
556	Blue quartz "eye" granite	78.01	10.53	2.46	0.14	1.40	3.35	1.03	0.02	0.02	0.27	1.33	98.56

Table 5. Sample description and selected metal analysis of samples collected from the Beidelman Bay occurrence.

Sample	Rock Type	Sample description	Au oz/ton	Cu ppm	Mo ppm	Zn ppm	Zr ppm	Trench Area	UTM WGS 84
541	Hydrothermal breccia	0.25 cm – 1.0 m size sulphide barren trondhjemite xenoliths in a gray, siliceous matrix. 1% fine grained disseminated py, 1-3% po, py within matrix, sulphides at rim of xenolith	N.D.	539	48	102	254	West	633453 E 5522303 N
542	Siliceous matrix	Matrix of hyrothermal breccia. Sample from same outcrop as 541. Gray coloured, siliceous, 3-5% py, po.	N.D.	1181	28	83	267	West	633453 E 5522303 N
542A	Trondhjemite xenolith	Trondhjemite xenolith. Sample from same outcrop as 541. 5% blue quartz eyes, tr py	N.D.	414	34	58	198	West	633453 E 5522303 N
543	Hydrothermal breccia	Similar to sample 541, increased oxidization and silicification, 1% py, po in matrix. Xenoliths area sulphide barren trondhjemite.	N.D.	2073	38	47	303	West	633441 E 5522294 N
544	Quartz vein	Vein is 0.5 m wide, with Cu- Mo- py- po. Vein orientation at 125/40N. Vein cuts hydrothrmal breccia. Chloritic mafic volcanic xenoliths in breccia adjacent to sample location.	N.D.	1864	1447	40	84	West	633700 E 5522312 N
545	Feldspar porphyry	This unit cuts hydrothermal breccia, abrupt contact. Porphyry orientated at 010/76W. 1-3% py. Width of unit unknown.	N.D.	71	6	36	86	West	633710 E 5522315 N
546	Altered trondhjemite	Alteration comprises silicification in form of quartz veins, chloritic altered mafic volcanic clasts, sericite, albite. 1% py.	N.D.	12	N.D.	12	155	West	633599 E 5522509 N
547	Blue quartz phenocryst granite	Silicified, sulphidized, weakly albitic altered granite. 15% medium- grained- blue coloured quartz penocrysts, Superimposed on all parts of sample is 10% cubic py.	N.D.	1088	152	33	124	West	633570 E 5522353 N
548	Hydrothermal breccia?	Matrix has 10% blue quartz phenocrysts, 15% fine- to cubic py White to gray colored xenoliths are trondhjemite with 3-5% po, py. Both matrix and remnants are moderately magnetitic.	N.D.	958	24	107	172	West	633776 E 5522371 N
549	Plagioclase – quartz porphyry	Equal amounts of medium- grained quartz and plagioclase, 1% py, po. Rock consists of 20% medium- to coarse- grained magnetite, strong magnetic attraction.	N.D.	7	1	57	225	West	633730 E 5522410 N

Sample	Rock Type	Sample description	Au oz/ton	Cu ppm	Mo ppm	Zn ppm	Zr ppm	Trench Area	UTM WGS 84
550	Hydrothermal breccia	Matrix contains 1% fine- grained, disseminated py, with 3% blebs of py. Chloritic mafic volcanic and silicified trondhjemite xenoliths.	N.D.	915	36	59	234	West	633502 E 5522272 N
551	Hydrothermal breccia	Similar to sample 550. 15-20% Mo within trondhjemite xenolith. Mo disseminated and along fracture surfaces.	N.D.	970	4758	75	223	West	633502 E 5522272 N
551a	Trondhjemite	Xenolith of sample from sample 551. Xenolith is host rock of Mo mineralization.	N.D.	313	1242	78	195	West	633502 E 5522272 N
552	Blue quartz phenocrytsts granodiorite	5% medium to 35% coarse- grained, blue quartz phenocrysts. 5% disseminated fine grained py, po. Minor chlorite alteration.	N.D.	91	9	71	341	Mattabi road	633583 E 5521472 N
553	Trondhjemite	Equigranular, 10% blue-gray coloured quartz phenocrysts, 5% py in mafic content, malachite on weathered surface.	N.D.	2642	35	110	64	East - E	634260 E 5522539 N
554	Altered trondhjemite	10% blue-gray coloured quartz phenocrysts and albite alteration, 1-3% py, po, moderately magnetic. Mafic content of rock <3 percent.	N.D.	852	18	1267	56	East - C	634245 E 5522530 N
555	Trondhjemite	Similar to sample 553, equigranular, 15% blue-gray coloured quartz phenocrysts, 1% py, tan colored weakly pleochroic boitite.	N.D.	456	12	129	70	East - G	634257 E 5522577 N
556	Blue quartz phenocrytsts granite	45% coarse grained, blue-gray coloured quartz phenocrysts, 5% py, po. Sulphides located in mafic content and quartz grains.	N.D.	7159	22	297	216	East - A	624230 E 5522556 N

N.D. not detected


49°51'20"
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N
Consolidated Morrison Expl. Ltd.
Exploration project
Sturgeon Lake
5523000N
Trondhjemite
East Trench Area
West Trench Area
Hydrothermal breccia zone
LEGEND
Inferred boundary of zones
Extent of logging activity
Roads
Creeks
552 Sample location
Volcanic xenolith trondhjemite
0
100
200
300
400
meters
552
Mattabi Mine Road
Granodiorite
Location Map
Occurrence
Dryden
0
50
km

Figure 3. Geology of the Beidelman Bay occurrence (*modified after* Steeprock Iron Mines Ltd. 1964).

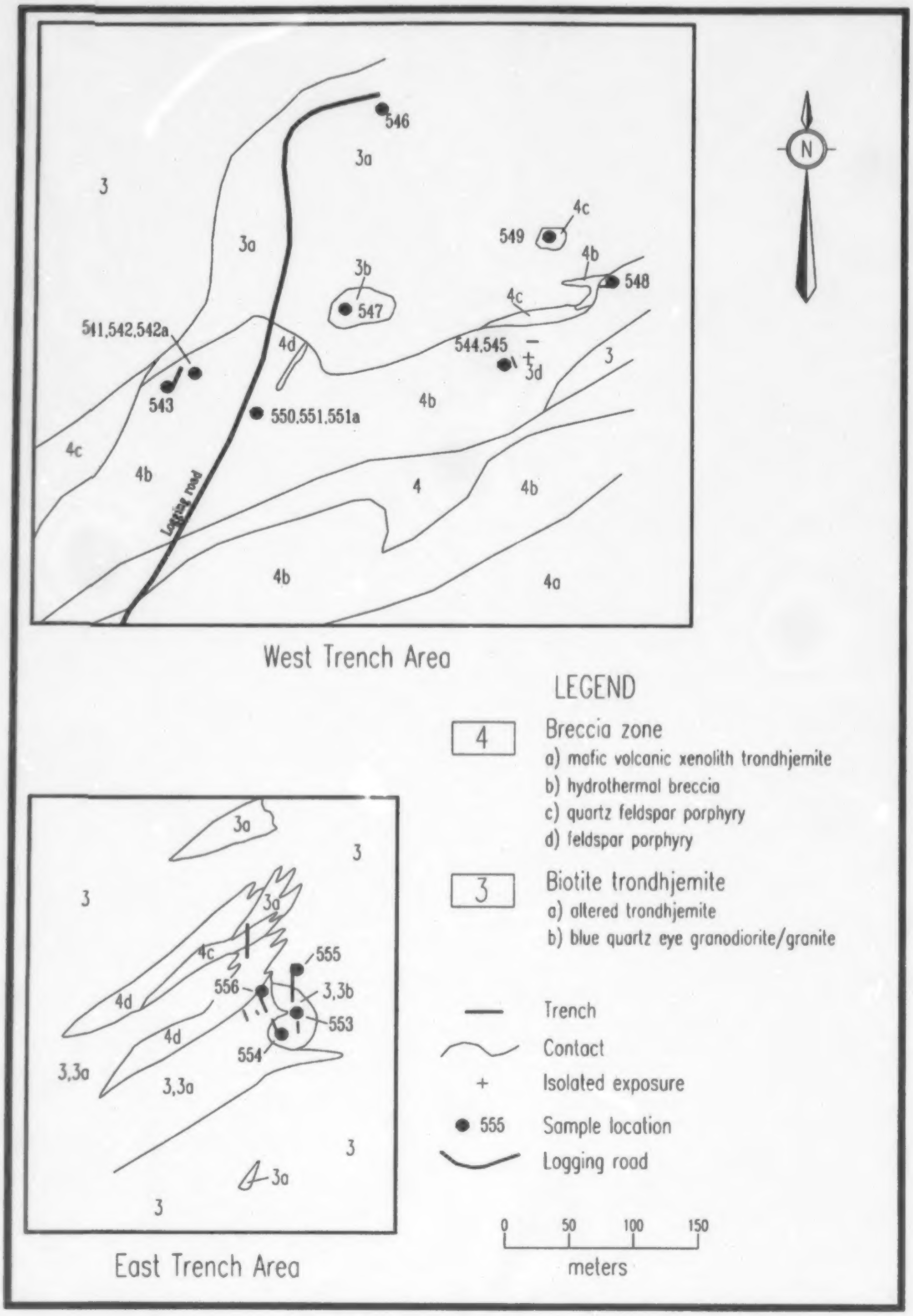

546
3a
3
3a
4c
549
4b
548
3b
547
4c
541,542,542a
4d
544,545
3d
3
543
550,551,551a
4b
4c
4b
Logging road
4
4b
4b
4a
West Trench Area
LEGEND
4 Breccia zone
a) mafic volcanic xenolith trondhjemite
b) hydrothermal breccia
c) quartz feldspar porphyry
d) feldspar porphyry
3 Biotite trondhjemite
a) altered trondhjemite
b) blue quartz eye granodiorite/granite
Trench
Contact
+ Isolated exposure
● 555 Sample location
Logging road
0
50
100
150
meters
3a
3
3
3a
4c
555
556
3,3b
4d
553
4d
554
3,3a
3,3a
3
3a
3
East Trench Area

Figure 4. Geology and sample locations of the Beidelan Bay occurrence east and west trench areas (*modified after* Steeprock Iron Mines Ltd. 1964).

Access to the west trench area is provided via recently constructed logging roads. Exposures, created by logging activity, extend from the Mattabi Mine Road north across the mafic volcanic, xenolithic trondhjemite, hydrothermal breccia and the northern altered trondhjemite units.

North of the Mattabi Mine Road, the xenolithic trondhjemite can be traced for 630 m. Strong, chlorite-altered, angular to subangular xenoliths are set in the massive trondhjemite. Centimetre to metre-sized xenoliths occupy from 5 to 75% of the exposed surface area. This rock type was not sampled during the visit. Northeast-striking, metre-wide, sulphidized shear zones cut the trondhjemite.

The contact of this trondhjemite and the hydrothermal breccia was obscured by overburden. The breccia comprises altered mafic volcanic, sulphidized trondhjemite and non-mineralized trondhjemite clasts set in a gray-coloured, sulphide-bearing matrix. The siliceous matrix contains elevated Cu and low Mo values (sample 542). The only samples to contain sulphidic trondhjemite clasts are #548 and #551. These clasts contain 3 to 5%, fine- to- medium-grained, disseminated pyrite and pyrrhotite. Sample 551 has a trondhjemite clast that contains visible molybdenum. The molybdenum is disseminated and concentrated along fractures. A non-mineralized part of this clast was submitted for analysis. Major element geochemistry confirms the rock type (*see* Table 4), and the metal analysis confirms elevated molybdenum in the clast (*see* Table 5).

A quartz vein hosted in the hydrothermal breccia contains Cu-Mo mineralization (sample 544). The hematite-stained quartz vein contains 1% pyrite and pyrrhotite, and visible molybdenum at the contact with the breccia.

The exposures created by logging activity could aid in locating a west extension of the breccia zones. A topographic low and wet conditions hamper the discovery of an eastern extension.

Rock types that contain blue quartz "eye" grains returned elevated copper values. Galley, van Breeman and Franklin (2000) state: "The highest grade Cu-Mo mineralization is associated with zones of intense silicification and quartz veining which coincide with the intersection of intrusive-hydrothermal breccia by the porphyry dikes." This could not be confirmed during the examination because no plagioclase-quartz porphyry exposures were adjacent to the quartz vein.

The only exposure of plagioclase-quartz porphyry examined (sample 549) was barren of sulphide mineralization but contained 20% medium-grained magnetite. In the western area, the only moderately to strongly magnetic exposures examined were samples 548 and 549. The magnetic matrix and clasts contained in the hydrothermal breccia (sample 548) are similar to the composition of plagioclase-quartz porphyry (sample 549). Contrary to Galley, van Breeman and Franklin (2000), this author concludes that the porphyry predates the breccia.

The northern trondhjemite (sample 546) is sericite, quartz and albite altered. The mafic volcanic remnants exhibit strong chlorite alteration. This non-mineralized trondhjemite returned low metal values.

The eastern trench area, located approximately 500 m east of the western area, is covered by pristine timber. Examination of outcrops is hampered by the masking effect of moss and lichen. The trenches provided the best exposures. Similar to the western area, copper mineralization is associated with rock types that contain blue-gray-coloured quartz grains. The eastern area samples returned lower molybdenum and higher copper values.

Unlike in the west area, biotite is associated with rock types in the eastern area. Rocks that contain tan-coloured, strongly pleochroic biotite returned values greater than 600 ppm Cu if FeO:MgO = 2.3:1 (Poulson and Franklin 1981). Sample 555, the only sample to contain pleochroic biotite, returned 452 ppm Cu.

Sample 554 returned elevated zinc values. Poulson and Franklin (1981) state: "A zone of zinc enrichment is centered on the copper occurrence". The extent of this zone is unknown.

Consolidated Morrison Exploration Ltd. (Kenora Assessment File 52G/14SE 0042) conducted an exploration program over the water of Sturgeon Lake (*see* Figure 3). Drill hole logs (BB-9) describe hybrid rock: "mixture of granodiorite, rhyolite, chloritized tuff and quartz-feldspar-porphyry". Drilling also intersected volcanic and intrusive breccia rocks. These rock types could be similar to those found at the Beidelman Bay occurrence. A similar mineralized zone could be present north of the Beidelman Bay occurrence.

Steeprock Iron Mines Ltd. (Kenora Assessment File 52G/14SE 0079) conducted ground geophysical, geological and soil geochemistry surveys over the east and west trench areas. The original ground location of grid lines could be located with the acquisition of selected global positioning satellite coordinates and aid of digital drafting. Examination of anomalous areas, especially in the logged western area, could locate new mineralization areas.

Previous geological studies and exploration programs have postulated that the Beidelman Bay occurrence mineralization is the result of a porphyry-style system. The hydrothermal and intrusive breccia zones, the biotite associated with copper mineralization, and the sericite and chlorite alteration are products observed at typical porphyry deposits (Poulson and Franklin 1981). In Canada, the Troilus Mine deposit model is the best comparison to the geological setting and mineralization located at the Beidelman Bay occurrence (A. Galley, personal communication, 2001).

COUSINEAU SOAPSTONE OCCURRENCE, HALKIRK TOWNSHIP (P. HINZ)

The Cousineau Soapstone occurrence is located in Halkirk Township (NTS 52 C/11NE), approximately 28 km east of the Town of Fort Frances (Figure 5). The occurrence can be accessed by a bush road which traverses north from Highway 11 (GPS location 497364/5397248 NAD27).

The occurrence is located within a property consisting of 2 contiguous claims held by R. Cousineau of Fort Frances. The area has been subjected to extensive exploration, primarily for copper-nickel mineralization. During road construction aimed at accessing a gravel deposit, Mr. Cousineau exposed a small outcrop of soapstone. During a property visit to another property held by Mr. Cousineau, the author was shown the soapstone outcrop. A sample was analyzed by powder X-ray diffraction which revealed the primary mineral constituents to be talc, amphibole and clinochlore, a chlorite mineral produced by contact metamorphism of mafic minerals.

The occurrence is underlain by rocks of the Fort Frances–Mine Centre greenstone belt, at the southern boundary of the Wabigoon Subprovince. The rocks are situated within a wrench zone identified by H. Poulsen (1986), between the Quetico fault to the north, and the dextral Seine River fault to the south. The rocks in the vicinity of the property are contained within a package of variably metamorphosed gabbro sills that are in intrusive contact with rocks of the Rice Bay Dome (Poulsen 1986). The rocks observed on the property are highly metamorphosed with primary textures completely obliterated. The term soapstone, as used by the author, refers to massive talc-rich rocks (Mitchell 1985).

The current property visit was conducted in order to examine outcrops exposed by the property owner. The soapstone is exposed over an area of approximately 500 by 300 m. Five outcrops were examined in this area with a total of 8 samples collected. The surface exposures are all deeply weathered. A pitted surface suggests the presence of magnetite crystals, which is supported by the strongly magnetic nature of the rocks. Structurally, the outcrops are quite variable, from massive to highly fractured, with random orientations to the fractures. Depth penetration of these surface fractures would have to be determined by either ground probing radar, diamond drilling or quarrying. The colour of the soapstone varies from grey, green, to brown. Only minor deleterious minerals were observed, these included minor epidote veining at one location and trace pyrite at another.

Samples collected by the author have been sent for powder X-ray diffraction analysis to confirm the mineral constituents over the current outcrop exposures. Results were pending at the time of writing.

The author recommended that test blocks be removed to evaluate the colour and textural consistency over the property. Samples were provided to local carvers by Mr. Cousineau; the carvers indicated that the stone is easily carved yet not too soft and yields a superior product with excellent polish.

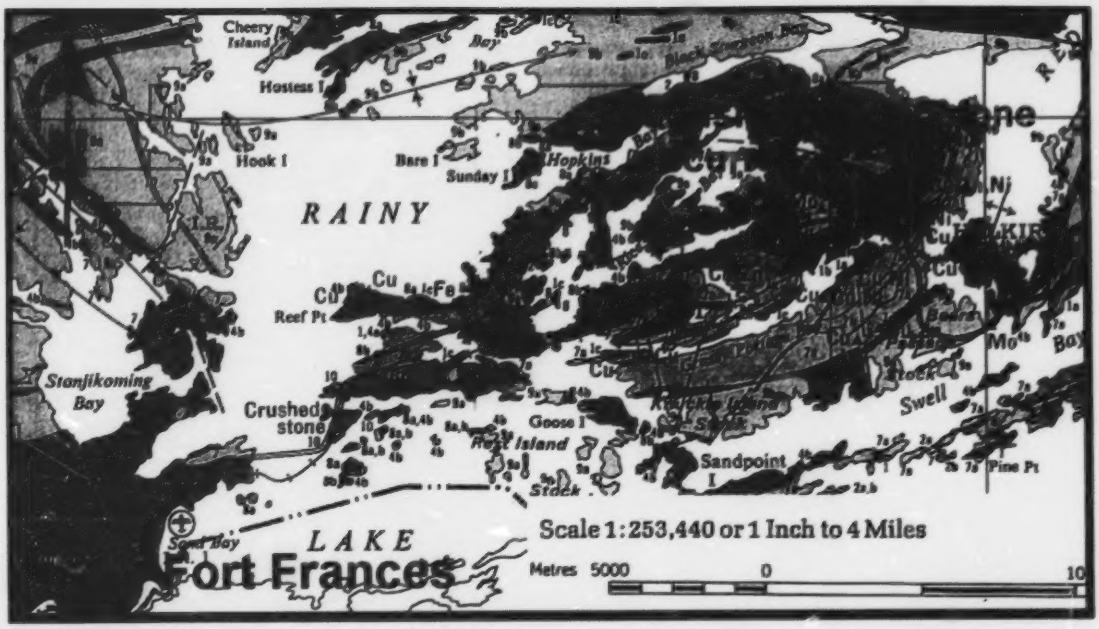


Figure 5. Location of the Cousineau Soapstone occurrence, Halkirk Township (*modified after* Blackburn, 1978).

DENMARK LAKE INTRUSIONS EXAMINATION (C. B. RAVNAAS)

During the fall of 2001, the author conducted a reconnaissance mapping and sampling program of the Denmark Lake area. The examination consisted of geologically mapping and sampling outcrops located along the Maybrun Road, logging roads, trails and the shoreline of Denmark Lake. The Maybrun Road is restricted to vehicle traffic, access is by Ministry of Natural Resources permit. The Denmark Lake area is located approximately 30 km east of the town of Sioux Narrows. The objective of the program was to evaluate the potential of the area to host copper, nickel and platinum group elements (PGE).

The area was mapped by J.C. Davies (1973) in Geological Report 111. The area is underlain by rocks of the Kakagi–Rowan Lakes greenstone belt, Wabigoon Subprovince. The supracrustal rocks of the area are mainly mafic metavolcanic, mafic intrusive and intermediate intrusive rocks of the Rowan Lake Volcanic Group. The intrusive complex in the Denmark Lake area consists of peridotite, gabbro, diorite, quartz diorite and granodiorite with enclosed remnants of metavolcanic, mafic intrusive and felsic intrusive rocks (Davies 1973). The ultramafic rocks are devoid of xenoliths. Davies (1973) states:

> The oldest rocks of the complex appear to be ultramafic, with gabbro, diorite, quartz diorite, and granodiorite being successively younger. Some ultramafic rocks may be younger intrusions. The general absence of mineral orientation in most rocks of the complex, the lack of obvious contact metamorphic effects, and the common occurrence of angular fragments suggest that the intrusions took place in a breccia zone which allowed rapid heat loss.

The strong lichen content that covered outcrops hampered rock and xenolith identification. Road construction and recent logging activity provided good exposures. One hundred and twenty five grab samples from 94 stops were collected for analysis during this examination. Table 6 illustrates the rock types, mineralization, xenolith content and significant outcrop features. Figures 6 and 7 illustrate the stratigraphy and stop locations of the area. Digital photographs related to stop features were taken during this examination. Significant mineralization and alteration were sampled and analyzed for whole rock geochemistry, PGE and metal content and are presented in Table 7. Based upon field examinations of stops 1 to 8, the southeast part of the area is composed predominately of intermediate intrusive rocks with xenoliths of mafic intrusive rocks. Sulphide content is associated with isolated and rare quartz pods. Mafic dikes are intruded along an easterly trend.

Stops 13 to 18, in the eastern part of the area, are composed predominately of intermediate intrusive rocks. The increased quartz and biotite content may have been introduced during the intrusion of the Atikwa Batholith.

Stops 12 to 29, in the area south of Outflow Lake, are underlain predominately by mafic intrusive rocks with varying xenolith content. Multiple zones of 80% xenolith content are located at stops 9, 20 and 25. The zones and xenolith elongation strike 110°. Stop 28, a multiple unit exposure provides a lithological representation of the area. An ultramafic unit with coarse pyroxene-crystal layering at 060/45N is parallel to the abrupt contact with adjacent quartz diorite. Over an exposure of several metres, the pyroxene crystals grade from coarse to fine grained from southeast to northwest across the unit. This exposure also contains a 6 cm wide vein of quartz in a 2.0 m wide highly carbonatized and chloritized gabbro. The trend of this altered zone is similar to the pyroxene layered ultramafic unit.

Stops 32 to 34, west of Outflow Lake, are composed predominately of mafic intrusive rocks with varying xenolith content. The most characteristic feature of stop 32 is the cuspate margin of a mafic xenolith, which suggests that the xenolith was not solidified (Pettigrew 2001) and represents the effects of mixing of two contemporaneous magmas. The exposure at stop 34 provides the best xenolith orientation of outcrops examined during this program. Elongated mafic xenoliths plunge 08° at 095°.

Exposures along the trail from stop 34 north to stop 45 demonstrate a repetition of the mafic intrusive rocks. Stop 39, a high relief exposure, provides a lithological representation of the area. Stratigraphy at stop 39 trends southeast and dips to the north. Lithological boundaries were not determined at other exposures in this area because of overburden.

Davies (1973) mapped exposures at stops 46 to 50 and stops 76 to 80 as mafic metavolcanic rocks. The exposures along the Maybrun Road are predominately mafic intrusive and mafic metavolcanic rocks. The mafic intrusive rocks contain mafic metavolcanic xenoliths. Stop 48, a multiple rock type exposure, is representative of the area. A chloritized melagabbro at this stop exhibits a unique differential alteration pattern which is also evident in stop 81. The quartz veins, feldspar porphyry dikes and shear zones in this area are north trending. Mafic dikes are absent.

Stops 81 to 100 are predominately mafic and intermediate intrusive rocks that contain mafic metavolcanic xenoliths. Stop 83, sample 678 contains 10%, medium-grained blue quartz eyes. The mafic intrusive rocks are similar to the north and eastern areas.

The rock types along the Denmark Lake shoreline exposures are diverse. Ultramafic to mafic intrusive rocks constitute the south shore. Mafic intrusive rocks with varying mafic xenolith content constitute the north shore. Cumulate plagioclase layering could be interpreted from sample 669, stop 74. The lichen obscured layering in outcrop, but the layering is evident in the cut section of the sample. Field orientation of the cut sample determined cumulate layering at 110/45°N.

The xenoliths and mafic dikes are barren of sulphides in the Denmark Lake area. The intrusive rocks are lithologically and structurally complex. A generalized rock type and associated xenolith pattern can, however, be determined and is presented in Table 6. Davies' (1973) mapping adequately identified the rock types but the strong lichen cover prevented xenolith and structural interpretation. Davies' (1967a, 1967b) preliminary geological maps provide an accurate base for additional work. The road and trail network along with the recent logging activity provide lichen-free exposures.

Table 6. Summary of stops for the Denmark Lake area.

Stop Number	Rock Types	Sample Number	Percentage and Type of Xenoliths	Sulphide Content	Alteration Mineralization	Outcrop Features	UTM NAD 27
1	Diorite and gabbro	557, 558	Nil	5% po, py tr cp	Chlorite	Nil	459437 E
	Mafic dike	NA	Nil	Nil	Quartz	Strike 082° dip 25°N	5467574 N
2	Diorite	559	10% mafic intrusive	1-5% po, py	Biotite	Nil	459473 E
	Mafic dike	NA	Nil	Nil	Chlorite - weak	Strike 100° dip 90°	5467749 N
3	Granodiorite	560	10% mafic intrusive	2% py, po	Epidote, chlorite	Rounded xenoliths	459436 E
	Mafic dike	NA	Nil	Nil	Nil	Nil	5467866 N
	Diorite	560A	Nil	1-3% py	Nil	Angular boulder	
4	Melagabbro	561	Nil	Tr py, po	Nil	Nil	459368 E 5468197 N
5	Granodiorite	562	5% mafic intrusive	Tr py	Epidote	Nil	459216 E 5468488 N
6	Leucogabbro	563	Nil	Tr py	Nil	10 cm quartz pods	459008 E 5468701 N
7	Melagabbro	564	Nil	1-3% po, py	Epidote	Several quartz veinlets	459066 E
	Mafic volcanic	NA	Nil	Nil	Nil	Contact strike 040° dip 90°	5468786 N
8	Gabbro	NA	5% M. metavolcanic	Nil	Nil	Nil	458938 E 5468950 N
9	Gabbro	565, 566	50% mafic intrusive	1% py	Chlorite, biotite	Rounder and elongated xenoliths	458905 E 5469159 N
10	Leucogabbro	567	5% mafic intrusive	1% py	Chlorite, biotite	Rounded and elongated xenoliths	459230 E 5469240 N
11	Leucogabbro	568	3% mafic intrusive and felsic intrusive	Tr py	Biotite	Nil	459247 E 5469292 N
12	Diorite	569, 570	10% mafic intrusive and	1% po	Epidote, albite	Metasediment clast in a mafic	459547 E
	Leucogabbro	571	M. metavolcanic	1% py, po	Nil	intrusive xenolith	5469430 N
	Mafic dikes	NA	Nil	Nil	Nil	Strike 030° dip 60°W	
13	Leucogabbro	572	Nil	Nil	Biotite	Nil	459848 E 5469741 N
14	Leucogabbro	NA	Nil	1% py	Nil	Pegmatitic pods	459950 E 5469766 N
15	Leucogabbro	573	Nil	1% py	Biotite	Biotite 10% of mafics	460095 E 5469705 N
16	Leucogabbro	574	Nil	1% py	Biotite, epidote	hornblende and biotite 15% of mafic component	460349 E 5469733 N

Stop Number	Rock Types	Sample Number	Percentage and Type of Xenoliths	Sulphide Content	Alteration Mineralization	Outcrop Features	UTM NAD 27
17	Quartz diorite	575	Nil	1% py	Quartz	Hornblende 80% of mafic	460681 E 5469694 N
18	Granodiorite	576	Nil	1% py	Biotite	Strong influence by Atikwa Batholith	461373 E 5470503 N
19	Gabbro	577	Nil	Tr py	Biotite	Hornblende 70% of mafic	458714 E 5469236 N
20	Gabbro	578[1], 579	80% mafic intrusive	1% po, py	Nil	2 zones with xenoliths elongation at 110° trend	458553 E 5469386 N
21	Gabbro	580	10% M. metavolcanic	Nil	Biotite, chlorite	Nil	458867 E 5469305 N
22	Diorite	581, 583	10% mafic intrusive	1% po	Nil	Nil	458368 E 5469425 N
	Diorite	582	5% mafic intrusive	1-5% po, py	Nil	Strike 010° dip 75°E	
	Mafic dike	584	Nil	Nil	Nil	5% py at contact	
23	Gabbro	585,	5% mafic intrusive	1-5% py	Nil	Nil	458218 E 5469527 N
	Basalt	585A	Nil	1% py	Calcite, chlorite	Contact strike 080° dip 60°N	
	Leucogabbro	586, 587, 588	Nil	Tr py	Biotite, quartz	Biotite – quartz association	
	Mafic dike	NA	Nil	Nil	Nil	Strike 070° dip 65°N	
24	Gabbro	589	Nil	5% py	Quartz, biotite	Nil	458023 E 5469545 N
25	Gabbro	NA	80% mafic intrusive	1% py	Biotite	2 zones with xenoliths elongation at 110° trend	457780 E 5469448 N
26	Gabbro	NA	40% mafic intrusive	1% py	Biotite	Nil	457631 E 5469500 N
27	Leucogabbro	590	5% M. metavolcanic	1-3 % py	Chlorite	Xenolith size 1 m	457462 E 5469516 N
28	Granite	591	Nil	1% po, py	Nil	Contact strike 060° dip 50°N	457182 E 5469544 N
	Leucogabbro	592	20% mafic intrusive	1% po, py	Quartz	Nil	
	Granodiorite	593	Nil	Nil	Nil	5% blue quartz eyes	
	Leucogabbro	594	Nil	1% py	Nil	Nil	
	Altered qtz zone	595, 595A	Nil	595A 5-10% py,po	Chlorite, calcite	2 m strike 080° dip 60°N	
	Pyroxenite	596, 597, 599	Nil	1% py, po	Nil	Pyroxene crystal layering	
	Leucogabbro	598	10% mafic intrusive	Tr py	Nil	contact strike 060° dip 45 °N	
29	Granite	NA	10% mafic intrusive	Nil	Nil	Xenolith size 1 cm to 1 m	456839 E 5469371 N

Stop Number	Rock Types	Sample Number	Percentage and Type of Xenoliths	Sulphide Content	Alteration Mineralization	Outcrop Features	UTM NAD 27
30	Basalt	600	Nil	5% py	Calcite, chlorite	Intermixed basalt and diorite	456245 E 5469637 N
31	Leucogabbro	601	Nil	Tr py	Quartz	Nil	455992 E 5469618 N
32	Gabbro	602	10% mafic intrusive	1% po, py	Biotite	3 cm quartz vein	456564 E 5470189 N
33	Leucogabbro	603[1]	30% mafic intrusive and	1-3% po, py	Nil	Cuspate margin of xenolith	456564 E 5470319 N
	--	--	10% M. metavolcanic	--	--	--	
	Mafic dike	NA	Nil	Nil	Nil	Nil	
33a	Quartz diorite	NA	30% mafic intrusive	1% po, py	Nil	Nil	456541 E 5470462 N
34	Gabbro	NA	50% mafic intrusive and M. metavolcanic	1% py	Nil	Elongated xenoliths plunge 008°@095°	456490 E 5470557 N
35	Granodiorite	604	Nil	1% po, py	Magnetite	Medium grained equigranular	456432 E 5470851 N
36	Quartz diorite	605	Nil	1% py	Biotite	Nil	456444 E 5470961 N
37	Leucogabbro	606	5% mafic intrusive	Tr py	Epidote	Nil	456426 E 5471089 N
38	Leucogabbro	607	Nil	1% py	Epidote	Nil	456348 E 5471330 N
39	Leucogabbro	608	Nil	3-5% py	50% epidote	Possible anorthosite phase	456273 E 5471373 N
	Melagabbro	609	5% mafic intrusive	Nil	Chlorite	Contact strike 145° dip 80°E	
	Feldspar porphyry	610	Nil	Nil	Nil	Contact strike 140° dip 85°E	
	Mafic dike	611	Nil	Nil	Nil	Contact strike 145° dip 75°E	
	Pyroxenite	612	Nil	1-3% py	Chlorite	Nil	
40	Leucogabbro	613	Nil	1% py	Quartz, chlorite, epidote	Numerous quartz veinlets	456195 E 5471462 N
41	Gabbro	614	5% mafic intrusive	1-3% po, py	Magnetite	Vari-textured	456161 E 5471542 N
42	Pyroxenite	615	Nil	1% py	Chlorite	Nil	456288 E 5471886 N
43	Diorite	616	Nil	1-3% py	Biotite	Mafic crystal foliation 085°	456418 E 5472008 N

Stop Number	Rock Types	Sample Number	Percentage and Type of Xenoliths	Sulphide Content	Alteration Mineralization	Outcrop Features	UTM NAD 27
43a	Leucogabbro	617	5% mafic intrusive	3% py, po	Epidote, chlorite	Strong epidote alteration	456461 E 5472147 N
44	Melagabbro	618	Nil	1% cubic py	Nil	Conchoidal fracturing	456454 E 5472556 N
44a	Granodiorite	619	5% mafic intrusive	1-3% py	Nil	Nil	456461 E 5472556 N
45	Gabbro	620	Nil	1% py	Epidote	1% blue quartz eyes	456256 E 5472565 N
46	Pyroxenite	621	Nil	Nil	Chlorite	Contact strike 040° dip 45°S	455864 E 5469580 N
	Leucogabbro	NA	10% mafic intrusive	1% py	Nil	Nil	
47	Leucogabbro	622	Nil	Tr py	Epidote quartz	Nil	455574 E 5469531 N
48	Amphibolite	623	Nil	1-3% po, py	Magnetite	Fine grained, massive	455180 E 5470087 N
	Shear amphibole	624	Nil	Nil	Calcite, chlorite	1 m strike 001° dip 75°W	
	Leucogabbro	625	5-15% amphibole	Nil	Nil	Xenolith size 0.1 – 1.0 m	
	Melagabbro	626	Nil	1-3% py, po	Chlorite	Unit differential altered	
	Melagabbro	627	Nil	10% py, po	Pyrite	No alteration	
	Quartz diorite	628	Nil	10-15% py	Nil	Nil	
	Leucogabbro	629, 631[1]	10% amphibole	10% py, 631[1] nil	Magnetite	Xenolith size 0.1 – 1.0 m	
	Leucogabbro	630	5% mafic intrusive	Tr py	Nil	Nil	
49	Feldspar porphyry	632	Nil	Nil	Nil	Contact strike 170° dip 75°W	454933 E 5470185 N
	Pyroxenite	633, 634	Nil	Tr py	Chlorite, biotite	Part of unit differential altered	
	Quartz vein	635	Nil	1% py	Nil	Strike 001° dip 60°W	
	Felsite zone	636	Nil	3% py	Nil	5 m wide zone	
50	Gabbro	637	20% mafic intrusive	3-10% py	Magnetite	Xenolith size 0.1 - 0.5 m	544822 E 5470307 N
51	Melagabbro	638	Nil	1% po, py	Nil	Nil	455557 E 5467982 N
52	Gabbro	639	Nil	Tr py	Albite	Nil	455221 E 5468147 N
53	Quartz diorite	640	20-30% mafic intrusive	1-3% py	Nil	Equigranular with blue quartz eyes	4550002 E 5468020 N
54	Granite	NA	20-30% mafic intrusive	1% py	Epidote	Xenolith size up to 0.5 m	544626 E 5467852 N

Stop Number	Rock Types	Sample Number	Percentage and Type of Xenoliths	Sulphide Content	Alteration Mineralization	Outcrop Features	UTM NAD 27
55	Leucogabbro	641	Nil	1% py	Nil	5% blue quartz eyes	454702 E 5468220 N
	Leucogabbro	642	Nil	3-5% py	20% calcite, chlorite	2+m wide strike 160° dip 52°W	
	Quartz vein	643	Nil	Tr py	Nil	1 m pod in altered zone	
56	Granodiorite	644	20% mafic intrusive	5% py	Epidote	10% blue quartz eyes	454726 E 5468425 N
57	Melagabbro	645	Nil	Nil	Chlorite	Nil	453829 E 5469458 N
	Mafic dike	NA	Nil	Nil	Nil	Strike 050° dip 75°N	
58	Gabbro	646	Nil	Tr py	Magnetite	Strong magnetic attraction	453498 E 5469485 N
59	Gabbro	647	Nil	Tr py	Epidote	Nil	453344 E 5469568 N
73B	Melagabbro	667B	Nil	1-3% py	Chlorite	Nil	452852 E 5470194 N
74	Pyroxenite	668	Nil	Nil	Chlorite	Contact strike 020° dip 55°W	453405 E 5469679 N
	Leucogabbro	669	Nil	1% py, po	Nil	Cumulative plagioclase layering strike 110° dip 45°N	
	--	--	--	--	--		
	Mafic dikes	NA	Nil	Nil	Nil	Strike 005° dip 80°W	
74A	Leucogabbro	669A	Nil	1-5% po, py	Magnetite	Sulphide associated with quartz content	453612 E 5469794 N
74B	Gabbro	NA	50% mafic intrusive and M. metavolcanic	Nil	Nil	Nil	453900 E 5469620 N
75	Pyroxenite	670	Nil	1% py, po	Nil	Nil	455233 E 5469344 N
75A	Gabbro	670A	Nil	3% py, po	Nil	Medium grained, equigranular	455123 E 5469395 N
75 B	Gabbro	670B	70% M. metavolcanic	Nil	Calcite, albite	70% albitization of plagioclase	455442 E 5469115 N
76	Amphibolite	671	Nil	3% py	Nil	Recrystallized mafic metavolcanic unit	454667 E 5470517 N
77	Leucogabbro	672	40% M. metavolcanic	3% py	Nil	Nil	544627 E 5470593 N

Stop Number	Rock Types	Sample Number	Percentage and Type of Xenoliths	Sulphide Content	Alteration Mineralization	Outcrop Features	UTM NAD 27
78	Amphibolite	673	Nil	5% py	Albite, epidote	Nil	454532 E 5470909 N
79	Amphibolite	NA	Nil	Tr py	Epidote	Relic pillows noted in outcrop	454494 E 5470987 N
80	Amphibolite	674	Nil	Nil	Epidote	Relic pillows noted in outcrop	454401 E 5471107 N
81	Melagabbro	675	Nil	Nil	Chlorite	Unit differentially altered	454309 E 5471202 N
82	Leucogabbro	676	10% M. metavolcanic	1% py	Nil	Nil	454250 E 5471247 N
83	Amphibolite	NA	Nil	Tr py	Nil	Nil	454089 E 5471368 N
84	Leucogabbro	677	20% M. metavolcanic and 3% mafic intrusive	Nil	Magnetite	Strong magnetic attraction	453936 E 5471419 N
85	Diorite	678	2% M. metavolcanic	Tr py	Biotite	Medium-grained blue quartz eyes	453601 E 5471325 N
86	Gabbro	679	1% M. metavolcanic	Tr py	Albite	Xenolith size 2-3 m	453450 E 5471203 N
87	Gabbro	680	25% M. metavolcanic	Nil	Nil	Nil	453346 E 5471133 N
88	Leucogabbro	681	15% M. metavolcanic	1% py	Nil	Nil	453136 E 5471143 N
89	Leucogabbro	NA	10% M. metavolcanic	1% py	Nil	Nil	452970 E 5471550 N
90	Basalt Leucogabbro	NA 682	Nil Nil	Nil 1% py	Nil Nil	Nil Medium grained, equigranular	452976 E 5471729 N
91	Basalt	683	Nil	Nil	Epidote, calcite	Alteration in veinlets	452869 E 5471905 N
92	Gabbro Pyroxenite Anorthosite	684 685 NA	5% M. metavolcanic Nil Nil	1-3% py, po 1-3% py cubic Nil	Epidote Biotite, chlorite Nil	Nil Strongly altered 0.5 m zone strike 120° dip 90°	452631 E 5471180 N

Stop Number	Rock Types	Sample Number	Percentage and Type of Xenoliths	Sulphide Content	Alteration Mineralization	Outcrop Features	UTM NAD 27
93	Leucogabbro	686	50% M. metavolcanic	Tr py	Quartz	Medium-grained blue quartz eyes	452679 E 5471075 N
94	Leucogabbro	687	Nil	1-3% po, py	Magnetite, albite	Medium-grained blue qtz. eyes	452788 E 5471046 N
	Leucogabbro	688	Nil	1% py	Magnetite	Medium grained, equigranular	
	Leucogabbro	NA	50% M. metavolcanic	Tr py	Nil	Nil	
95	Leucogabbro	NA	80% M. metavolcanic	Tr py	Nil	Nil	452952 E 5470923 N
96	Gabbro	689	Nil	1% py cubic	Epidote	Nil	453057 E 5470856 N
97	Amphibolite	690	Nil	1-3% py	Chlorite	Oxidation pods diameter 0.5 m	453378 E 5470289 N
98	Melagabbro	691	Nil	Tr py	Chlorite, biotite	Nonmagnetic, non altered unit	453065 E 5470646 N
	Melagabbro	692	Nil	1% py	Magnetite, chlorite	Magnetite, chlorite altered unit	
99	Leucogabbro	693	Nil	1-3% po, py	Magnetite	Fracture pattern strike 115°	453032 E 5470300 N
100	Gabbro	694	Nil	1-3% py, po	Nil	Nil	452915 E 5470731 N

578[1] Sample of xenolith

M. metavolcanic – Mafic metavolcanic rocks

NA not sampled

Table 7 presents selected element and MgO analyses for samples from the Denmark Lake area. The bold font in the table indicates enriched values. Enrichment is defined as any value greater than the average calculated for that particular element for a certain rock type (averages presented in Table 8). Enrichment of MgO is based on a more rigorous screen, and is defined as being greater than the average value plus 80%, with the average based on data in the shareware package NEWPET (1987-1992).

Exposures of intermediate intrusive rocks (diorite, quartz diorite and granodiorite) with anomalous elements are located east of Denmark and Outflow lakes. A majority of the ultramafic intrusive rock (pyroxenite) exposures have elevated MgO content. These exposures are located west of Outflow Lake. Anomalous copper and sulphur are only present in two of these exposures. Chlorite alteration is observed in a majority of exposures with elevated MgO.

The mafic intrusive rocks (melanogabbro, gabbro and leucogabbro) samples from exposures located along the shore and north of Denmark Lake contain elevated MgO, some having multi-element enrichment. Similar anomalous exposures are located on the trail west of Outflow Bay and the logging road south of Outflow Lake.

The potential for the presence of PGE concentration is favorable in these enriched mafic intrusive rocks. Mafic intrusive rocks with elevated MgO and anomalous element values are associated with chlorite, quartz, calcite and magnetite alteration. Detailed examination of these exposures is planned for 2002.

Table 7. Element, Pt, Pd and MgO values for enriched samples from the Denmark Lake area.

Stop	Sample	Rock Type	Co ppm	Cr ppm	Cu ppm	Mg ppm	Ni ppm	S ppm	Ti ppm	MgO* wt. %	Pt ppb	Pd ppb
1	557	Diorite	13	N.D.	**46**	5452	8	**1267**	4137	0.99	N.D.	N.D.
1	558	Leucogabbro	9	N.D.	117	3185	5	**3143**	2688	0.53	N.D.	N.D.
3	560A	Diorite	44	**616**	16	**59084**	**264**	364	1875	**11.06**	N.D.	N.D.
4	561	Melanogabbro	56	21	29	56065	84	1343	2765	**10.36**	N.D.	N.D.
12	569	Diorite	25	67	**43**	16996	41	502	3811	3.44	N.D.	N.D.
16	574	Leucogabbro	39	59	73	26345	71	812	5991	4.83	N.D.	N.D.
17	575	Quartz diorite	37	**139**	56	32465	89	745	3726	NA	N.D.	N.D.
18	576	Granodiorite	22	**51**	N.D.	15653	**38**	329	3281	2.84	N.D.	N.D.
22	583	Granodiorite	20	**41**	**29**	13800	31	311	2321	2.51	N.D.	N.D.
23	585	Gabbro	37	25	117	23425	176	**2403**	4428	4.28	**11.19**	**25.65**
23	586	Leucogabbro	46	55	N.D.	29634	89	547	**7913**	5.44	N.D.	N.D.
23	587	Leucogabbro	50	N.D.	62	20937	16	**2904**	**15955**	3.90	N.D.	N.D.
23	588	Leucogabbro	51	N.D.	137	17970	17	**4277**	**14370**	3.31	N.D.	N.D.
28	595A	Quartz vein	25	14	37	**21829**	57	214	**3351**	4.01	N.D.	N.D.
28	596	Melanogabbro	55	**540**	10	**84002**	**402**	938	2202	**16.30**	N.D.	N.D.
28	597	Pyroxenite	75	999	34	111525	561	908	1452	**21.80**	N.D.	N.D.
28	599	Pyroxenite	67	879	**93**	95354	416	**1705**	2355	**18.64**	N.D.	N.D.
30	600	Basalt	35	39	56	22052	39	**1840**	6601	4.08	N.D.	N.D.
39	609	Melanogabbro	54	**868**	11	**85267**	**459**	440	1044	**16.24**	N.D.	N.D.
39	611	Mafic dike	22	37	43	**17206**	33	563	2845	3.08	N.D.	N.D.
39	612	Pyroxenite	65	1140	55	100505	516	934	1499	**19.16**	N.D.	N.D.
42	615	Pyroxenite	68	1454	14	104401	512	506	2098	**20.24**	N.D.	N.D.
44	618	Melanogabbro	62	**639**	53	70409	299	875	3694	**13.39**	N.D.	N.D.
44A	619	Granodiorite	19	18	**51**	12334	28	365	2606	2.22	N.D.	N.D.
46	621	Pyroxenite	83	1246	N.D.	123804	980	217	1917	**23.69**	N.D.	N.D.
48	626	Melanogabbro	73	**1104**	**227**	**88846**	**738**	**2380**	1500	**16.83**	**12.85**	**14.94**
48	627	Melanogabbro	56	**933**	**575**	61601	**574**	2146	3216	**11.39**	**20.34**	**22.05**
48	628	Quartz diorite	25	60	**66**	18161	41	455	3007	3.31	N.D.	N.D.
49	633	Pyroxenite	95	935	74	115257	672	639	1765	**22.45**	N.D.	N.D.

Stop	Sample	Rock Type	Co ppm	Cr ppm	Cu ppm	Mg ppm	Ni ppm	S ppm	Ti ppm	MgO* wt. %	Pt ppb	Pd ppb
49	634	Pyroxenite	98	1029	22	121934	681	381	1830	**23.54**	**8.83**	**9.57**
51	638	Melanogabbro	71	**701**	69	**93078**	**510**	784	1724	**16.99**	N.D.	N.D.
57	645	Melanogabbro	63	**481**	18	79586	**399**	500	2403	**14.58**	N.D.	N.D.
58	646	Melanogabbro	55	401	93	64838	185	1531	2635	**12.06**	N.D.	N.D.
59	647	Gabbro	57	455	N.D.	66042	356	478	2104	**12.07**	N.D.	N.D.
73B	667B	Melanogabbro	71	**1123**	103	76075	**502**	1526	3098	**14.17**	N.D.	N.D.
74	668	Pyroxenite	97	492	N.D.	113622	720	233	2044	**21.49**	N.D.	N.D.
74	669	Leucogabbro	49	84	187	31552	83	**2338**	**7608**	5.82	N.D.	N.D.
74A	669A	Leucogabbro	51	236	**273**	44326	234	**3152**	3356	8.19	N.D.	N.D.
75	670	Pyroxenite	70	925	**143**	97275	321	1221	1694	**18.51**	N.D.	N.D.
75A	670A	Gabbro	55	**584**	174	79510	224	1286	1686	**15.03**	N.D.	N.D.
77	672	Leucogabbro	27	5	96	18904	19	**2238**	6101	3.49	N.D.	N.D.
80	674	Amphibolite	35	16	**49**	26558	33	1420	5191	4.82	N.D.	N.D.
81	675	Pyroxenite	92	63	48	100594	459	605	1245	**19.21**	N.D.	N.D.
85	678	Diorite	31	19	34	29870	83	**873**	2538	5.39	N.D.	N.D.
86	679	Gabbro	48	366	41	59882	228	1038	2353	**11.07**	N.D.	N.D.
87	680	Gabbro	74	21	22	61164	200	616	2556	**11.40**	N.D.	N.D.
92	685	Pyroxenite	87	812	16	105696	474	660	2054	**21.64**	**13.28**	N.D.
94	687	Leucogabbro	57	N.D.	179	27896	46	**2428**	**7808**	5.18	N.D.	N.D.
94	688	Leucogabbro	40	29	61	25011	49	1824	5884	5.01	N.D.	N.D.
96	689	Leucogabbro	38	77	26	30003	34	1404	6798	5.35	N.D.	N.D.
97	690	Amphibolite	56	113	25	50231	**262**	730	3205	9.27	N.D.	N.D.
98	691	Melanogabbro	80	124	N.D.	**100438**	**1013**	196	1104	**19.15**	**14.44**	N.D.
98	692	Melanogabbro	**97**	301	35	**116803**	**1009**	214	1486	**21.82**	**11.53**	N.D.
99	693	Leucogabbro	61	398	47	71958	340	1177	2777	**14.12**	N.D.	N.D.
100	694	Gabbro	53	**886**	106	69586	**408**	714	1737	**15.03**	N.D.	N.D.

*MgO average value from NEWPET 1987-1992 (IGNEOUS.xls)
NA not available
N.D. not detected
Bold font indicated enriched values

Table 8. Average element values for rock types from Denmark Lake area.

# of Samples	Rock Type	Co	Cr	Cu	Mg	Ni	S	Ti	MgO*
12	Pyroxenite	81	850	47	141608	565	726	1739	16.04
95	Gabbro	46	263	114	46398	216	1224	3816	7.59
9	Diorite	26	90	23	21351	62	440	3027	3.71
7	Quartz diorite	23	66	36	19366	51	798	3298	NA
9	Granodiorite	14	13	13	9555	18	350	2341	1.74
5	Amphibolite	38	62	21	30114	99	819	4338	NA
3	Basalt	46	163	154	39849	160	891	5205	6.73

*MgO average value from NEWPET 1987-1992 (IGNEOUS.xls)
NA not available

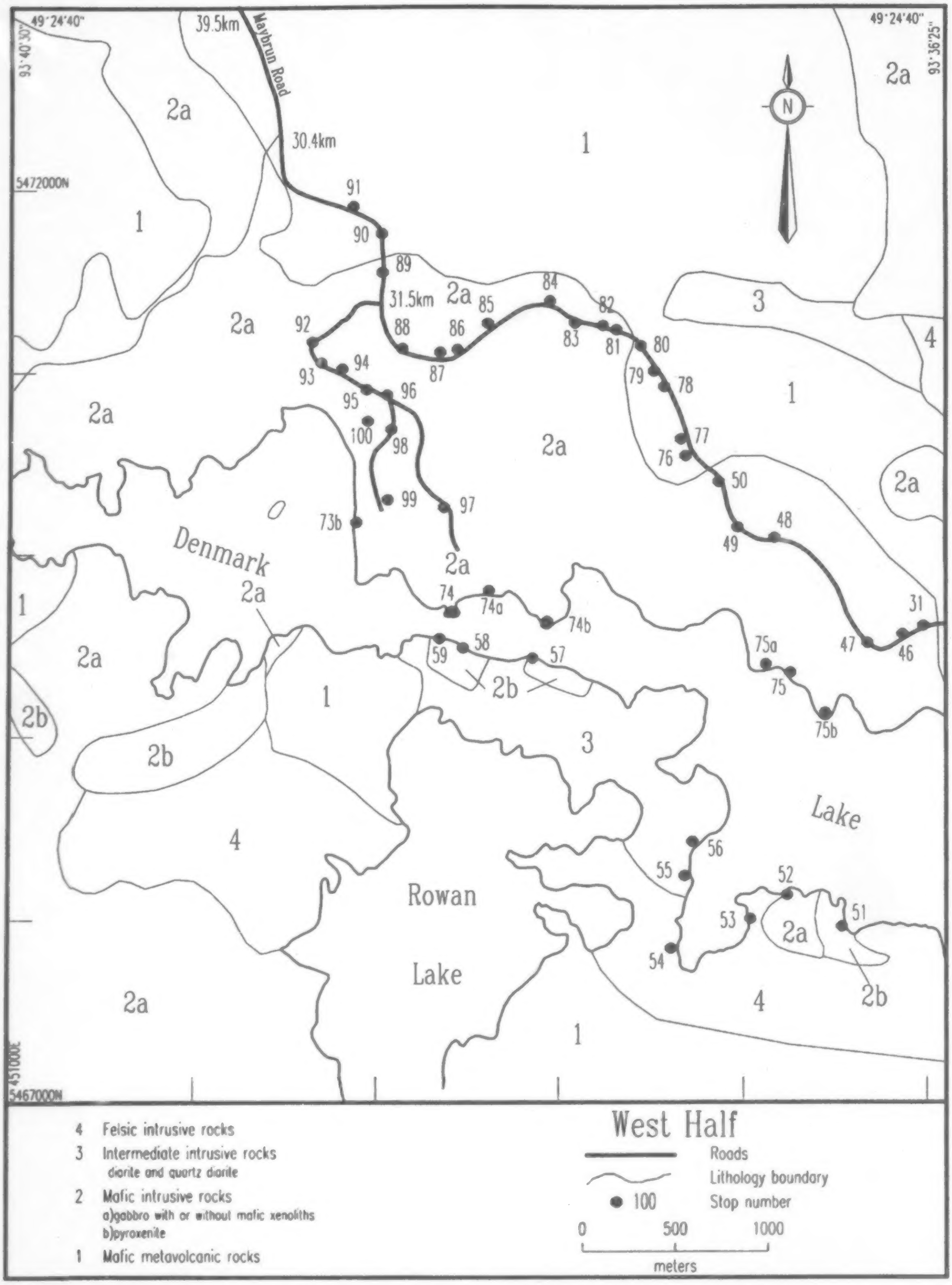

49°24'40"
93°40'30"
39.5km
Maybrun Road
30.4km
31.5km
5472000N
5467000N
451000E
49°24'40"
93°36'25"
N
Denmark
Rowan
Lake
Lake
1
2a
2b
3
4
91
90
89
92
93
94
95
96
100
98
99
97
88
87
86
85
84
83
82
81
80
79
78
77
76
50
49
48
47
46
31
73b
74
74a
74b
59
58
57
75a
75
75b
56
55
52
53
51
54
4 Felsic intrusive rocks
3 Intermediate intrusive rocks
diorite and quartz diorite
2 Mafic intrusive rocks
a)gabbro with or without mafic xenoliths
b)pyroxenite
1 Mafic metavolcanic rocks
West Half
Roads
Lithology boundary
● 100 Stop number
0
500
1000
meters

Figure 6. Geology and stop locations of the Denmark Lake area west half (*modified after* Davies 1973).

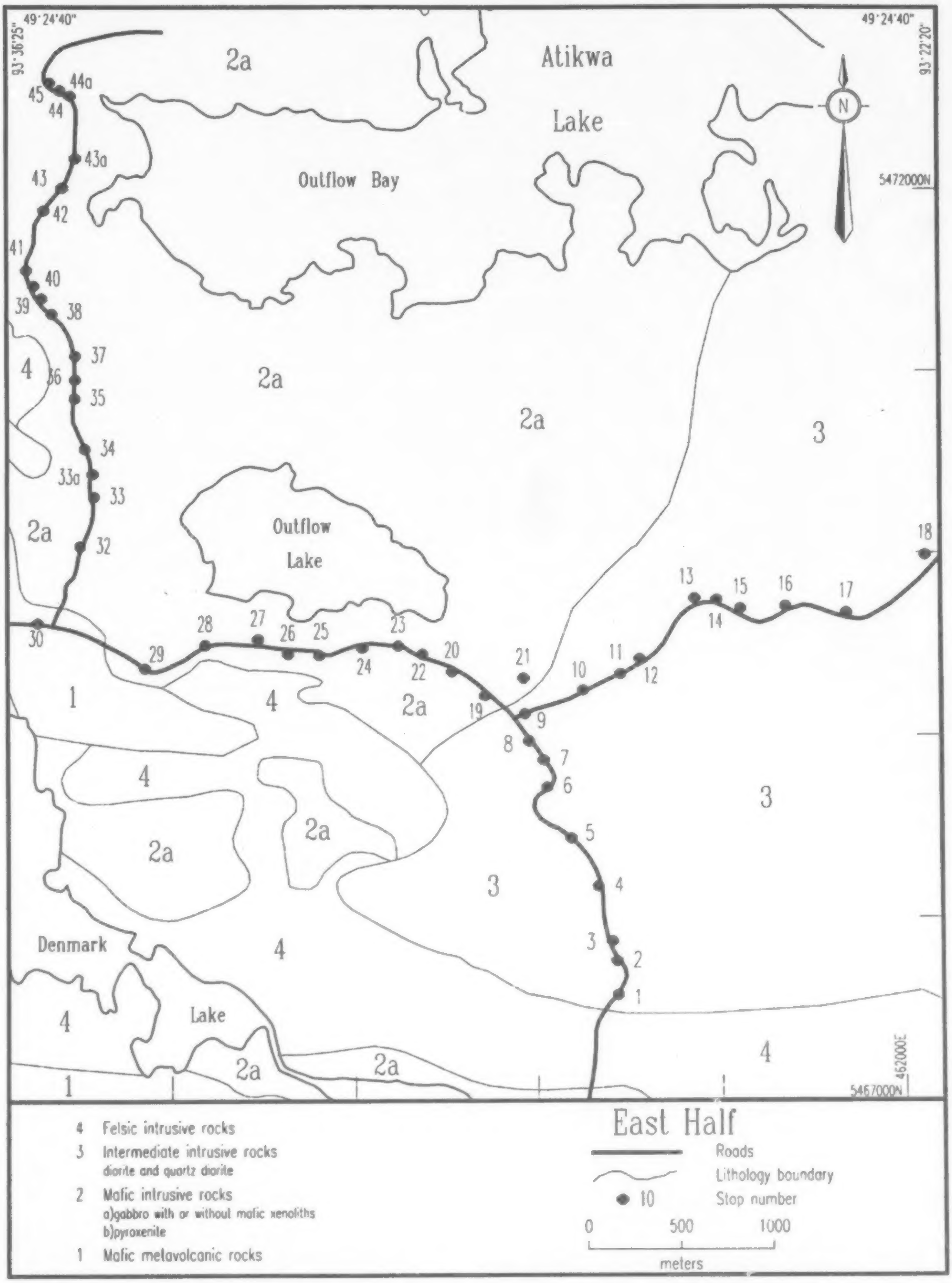

49°24'40"
93°36'25"
49°24'40"
93°22'20"
5472000N
5467000N
462000E
N
Atikwa
Lake
Outflow Bay
Outflow
Lake
Denmark
Lake
1
2a
3
4
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 32 33 33a 34 35 36 37 38 39 40 41 42 43 43a 44 44a 45
4 Felsic intrusive rocks
3 Intermediate intrusive rocks
diorite and quartz diorite
2 Mafic intrusive rocks
a)gabbro with or without mafic xenoliths
b)pyroxenite
1 Mafic metavolcanic rocks
East Half
Roads
Lithology boundary
● 10 Stop number
0
500
1000
meters

Figure 7. Geology and stop locations of the Denmark Lake area east half (*modified after* Davies 1973).

GLATZ OCCURRENCE, TURTLEPOND LAKE AREA (P. HINZ)

The Glatz occurrence is located in the Turtlepond Lake area (NTS 52 F/10SE), approximately 30 km south of the city of Dryden (Figure 8). The occurrence can be accessed by a logging road and bush trail, 1.5 km to the west of the Highway 502 (GPS location 520453/5484342 NAD27).

The occurrence is located within a property consisting of 5 contiguous claims, held by Messrs. A. Glatz and I.J. Riives of Dryden. A number of exploration programs have been conducted over the property since A. Glatz discovered copper-nickel mineralization in 1965. Initial grab samples returned values of 0.77% Cu and 0.21% Ni. The property was optioned by Victoria Algoma Mineral Co. Ltd., which conducted surface geophysics and diamond drilling, no assays were reported. In 1970 Lynx Canada Expl. Ltd. conducted mechanical stripping and trenching over a strikelength of 700 m. Sampling by Lynx Canada yielded values up to 1.95% Ni and 0.45% Cu as well as 0.55% Ni and 1.6% Cu. In 1987 St. Joe Canada Inc. staked the property for its platinum group metal potential and conducted geological mapping. During 1999 and 2002 Messrs. Glatz and Riives re-staked the property and conducted prospecting and sampling.

The occurrence is underlain by gabbroic rocks peripheral to the Dore lobe of the Atikwa Batholith. While Map 2443 (Blackburn, Beard and Rivett 1981) indicates the area is hosted within mafic metavolcanic rocks of the Manitou Lakes greenstone belt, this does not correlate with what is observed on the property. The property lies in an area that has never been mapped in detail. The rocks range in composition from quartz gabbro, leucogabbro, gabbro to melagabbro and contains sulphides from trace to semi-massive concentrations. The sulphides occur as disseminations and pods up to centimetres in size. The author believes that this property may represent an extension of the Emmons–Prig Cu-Ni-PGE occurrences located 5 km to the north. These lithologies were recommended by the author (Hinz and Ravnaas 1999) for further exploration.

The current property visit was conducted in order to examine the Lynx Canada trenches, sample the various lithologies and to assess the property's potential to host platinum group metal mineralization. All trenches are heavily overgrown, the rocks are weathered and gossanous. The host rocks include quartz-gabbro, leucogabbro, gabbro and melagabbro. Textures range from fine to coarse grained and several cut samples displayed uralitization indicative of hydrothermal alteration. This may have been caused by fluids produced during the intrusion of the Dore Lobe of the Atikwa Batholith. One sample (GO-006) displayed pseudo-layering, the presence of which might account for the variable lithologies between trenches.

A total of 12 samples were taken from the various trenches at the Glatz occurrence. Sulphide mineralization ranged from trace to semi-massive and included pyrite, chalcopyrite, pyrrhotite and possible bornite. None of the samples submitted by the author yielded platinum or palladium values. Nickel values ranged from 0.13% to 1.01% and copper from 0.09% to 0.36%. These values were obtained from the trenches over a strikelength of approximately 700 m.

The lack of significant platinum group metal values was disappointing; however, the author believes the property and surrounding ground should be examined for potential copper-nickel-platinum group metal mineralization. Other than the immediate property, the area has never been mapped in detail. The substantial copper and nickel values, presence of hydrothermal alteration and favourable lithologies suggest that the property and surrounding area may have the potential to host copper-nickel-platinum group mineralization. The presence of significant platinum and palladium values, up to 717 ppm platinum and 1012 ppm Pd, identified in similar rocks at the Emmons–Prig occurrences (Hinz and Ravnaas 1999) further supports this assertion.

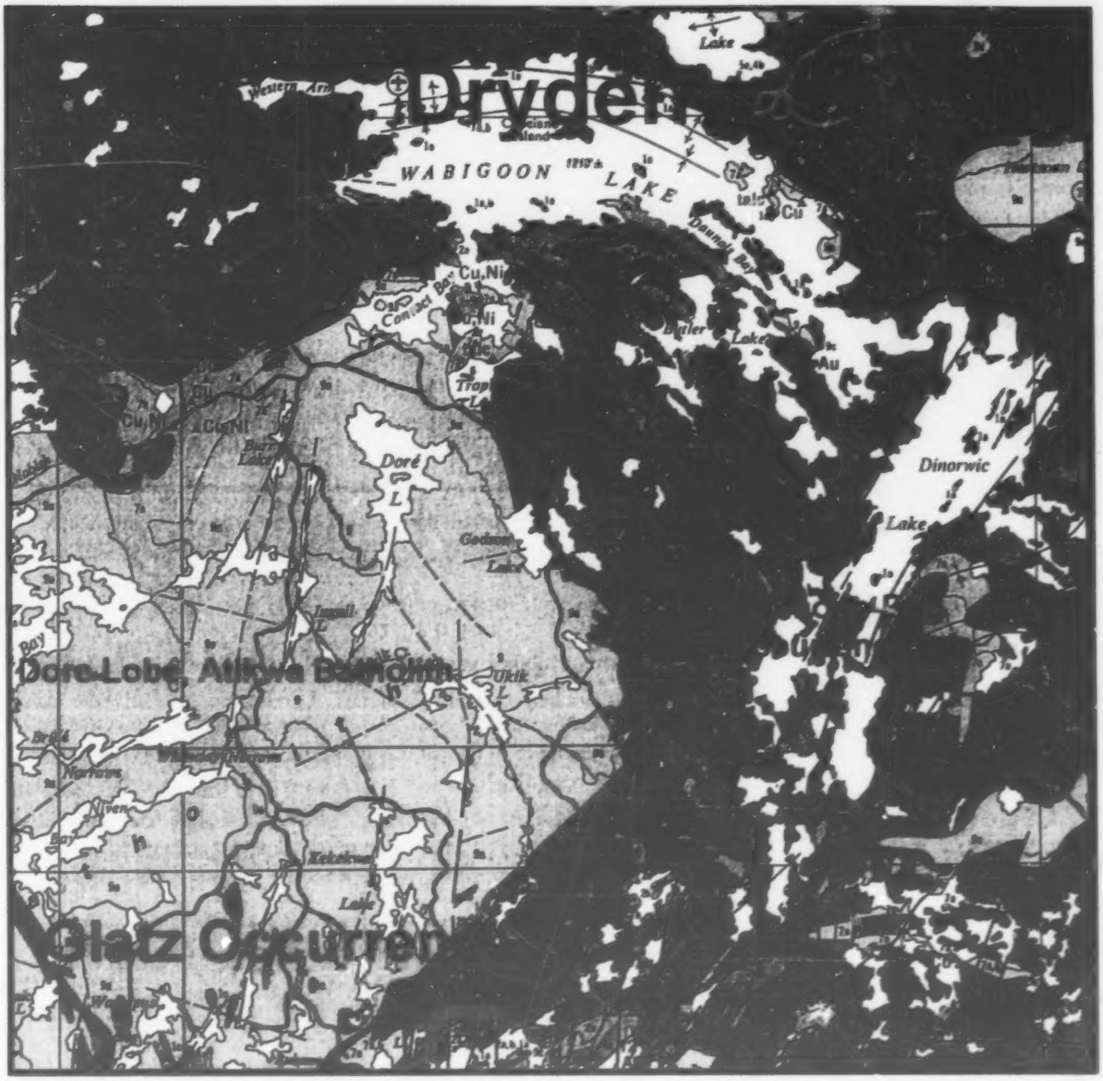

Lake
Western Arm
Dryden
WABIGOON LAKE
Cu
Contact Bay
Cu,Ni
Cu,Ni
Butler Lake
Au
Trap L
Cu,Ni
Burn Lake
Doré L
Dinorwic Lake
Godson Lake
Ingall L
Dore Lobe, Atikwa Batholith
Uktik L
Narrows
Kekekwa Lake
Glatz Occurren

Figure 8. Location of the Glatz occurrence, Turtlepond Lake area (*modified after* Blackburn 1978).

KEIKEWABIK ZINC-GOLD PROPERTY (C. RAVNAAS)

Dryden prospectors A. Glatz and A. Kozowy hold one unpatented claim that covers the Keikewabik zinc-gold property. The property, located 45 km northeast of the City of Dryden, is accessible via the Basket Lake Road, which connects to Highway 17. The property is approximately 100 m east of the north end of Swimit Lake.

The area is underlain by rocks of the Minnitaki Lake greenstone belt, Wabigoon Subprovince. The supracrustal rocks of the area are mainly mafic metavolcanic, felsic metavolcanic and mafic intrusive rocks of the South Volcanic Belt. The Wabigoon fault is located northwest of the property. The felsic intrusive rocks of the Basket Lake batholith are located east of the property (Blackburn et al. 1991).

The Keikewabik occurrence consists of 3 stripped exposures (West, Central and East Stripped Areas) that contain intensely sericitic mafic metavolcanic rocks with anomalous zinc and lead values. Twenty nine grab samples were collected for analysis during this examination. The metal analysis is presented in Table 9 and the major element geochemistry in Table 10. Figures 9 and 10 illustrate the stratigraphy and sample locations of the property.

A 70 m zone of fine-grained to plagioclase-phyric gabbro (sample 536) extends eastwards from Swimit Lake to the West Stripped Area (*see* Figure 9). The West Striped Area is underlain by the following southwest- to northeast-trending sequence:

a) 10 m of unaltered quartz vesicular mafic metavolcanic rock (sample 535).
b) 5 to 10 m of altered quartz vesicular mafic metavolcanic rock (sample 534).
c) 8 m of felsic metavolcanic rock that contains anomalous zinc (sample 523).
d) 3 m of debris flow consisting of mafic metavolcanic rock fragments (sample 522).
e) 2 m of garnetiferous mafic metavolcanic rock (sample 521).
f) 5 m of intensely sericitic-altered mafic metavolcanic rock with anomalous zinc and lead values.
g) 2.5 m of unaltered mafic metavolcanic rock (sample 518).

A 25 m zone of fine-grained, altered (samples 517, 533) plagioclase-phyric (sample 537) gabbro extends from the West to the Central Stripped Area. The 15 m of exposure comprising the Central Area contains intensely sericitic mafic metavolcanic rocks.

The East Stripped Area can be divided into the following southwest- to northeast-trending sequence:

a) a 4 m zone of weak albite and sericite-altered mafic metavolcanic rocks (sample 516, 529).
b) 4 m of mafic metavolcanic rocks (sample 515) that contain narrow quartz veins.
c) 1 m of mafic metavolcanic breccia (sample 514).
d) an 8 m zone of intensely sericite-altered mafic metavolcanic rock. A 0.5 m feldspar porphyry intrudes this zone (sample 528).
e) 3 m of felsic metavolcanic rock.

The remainder of the exposures north of the East Stripped Area contain mafic metavolcanic rocks. Southeast trending pillowed lava flows, northeast of the Basket Lake Road (*see* figure 9), have a northeast facing direction.

Table 9. Selected assay results of samples collected from the Keikewabik property.

Sample	Sample Description	Alteration Mineral	Au ppb	Ba ppm	Cu ppm	Mn ppm	Pb ppm	Zn ppm	Zr ppm
511	Andesite 10-15% py	30% sericite, sulphide	N.D.	1090	24	434	35	116	164
512	Andesite 20-25% py	30% sericite, sulphide	N.D.	479	34	839	22	165	128
513	Basalt 3% py	Albite, sericite	N.D.	702	23	650	19	195	146
514	Breccia (andesite) 5-10% py, po	Calcite	N.D.	199	59	1672	7	135	128
515	Andesite 1-3% py, po	Albite, sulphide	N.D.	78	10	1777	5	178	75
516	Andesite 5% py	Albite, sulphide	N.D.	90	30	728	14	137	129
517	Gabbro 3% py	Chlorite	N.D.	52	161	1049	11	114	8
518	Basalt 5% py	Sericite, sulphide	N.D.	239	45	676	28	143	150
519	Basalt 5-10% py	20% sericite, sulphide	N.D.	1839	52	646	39	2352	259
520	Basalt 3% py	20% sericite, albite	N.D.	2194	50	892	285	766	333
521	Basalt 5% py, 20% garnets	Garnet, magnetite	N.D.	46	25	>2500	12	2595	76
522	Debris flow (basalt) 5% py, po	Sericite, sulphide	N.D.	1094	36	652	27	436	242
523	Dacite 5% py, 5% sphalerite	Sericite, sulphide	N.D.	81	31	289	27	5518	164
524	Basalt 15-20% py, 5% sphalerite and galena	10% sericite, sulphide	N.D.	1119	107	478	7000	6231	158
525	Basalt 15-20% py, 5% sphalerite and galena	10% sericite, sulphide, albite	N.D.	1135	32	390	6462	8806	214
526	Andesite 1% py, po	Calcite	N.D.	238	7	1857	25	176	213
528	Feldspar porphyry 1% po, py	Nil	N.D.	698	6	223	9	41	101
529	Andesite 1% po, py	Albite	N.D.	139	12	1281	7	183	156
530	Rhyolite 1% py	Calcite, sulphide	N.D.	226	24	1861	5	154	164
531	Andesite 5% py, po	10% sericite	N.D.	175	18	1849	13	147	73
532	Andesite 10% py	10% seriate, sulphide	N.D.	981	32	105	173	327	249
533	Gabbro 1% py	Albite, sulphide, carbonate	N.D.	44	137	1339	5	92	11
534	Basalt 1% py, po	Sulphide	N.D.	251	73	2269	5	862	262
535	Basalt 3-5% py, po	Albite, sericite quartz	N.D.	229	23	1213	5	243	153
536	Gabbro 1% py	Sulphide	N.D.	102	46	1625	3	134	54
537	Gabbro 1% py	Chlorite	N.D.	63	90	1158	2	122	33
538	Basalt 1% py	Calcite	N.D.	30	53	830	3	92	89
539	Basalt 1% py	Sericite	N.D.	98	87	1329	3	131	98
540	Basalt 1% py	Albite, sericite	N.D.	428	9	1190	4	159	267

Table 10. Major element geochemistry of samples collected from the Keikewabik property.

Sample	Rock Type	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	MgO %	CaO %	Na_2O %	K_2O %	MnO %	P_2O_5 %	TiO_2 %	LOI %	Total %
511	Andesite	45.20	16.79	**18.26**	**1.17**	2.70	2.54	**3.79**	0.07	0.34	0.89	8.58	100.32
512	Andesite	58.69	13.78	11.36	**1.56**	3.98	3.81	2.00	0.14	0.31	0.78	3.22	99.62
513	Basalt	**61.32**	14.54	9.71	**1.69**	2.70	3.37	**2.90**	0.10	0.34	0.85	2.99	100.51
514	Breccia (andesite)	49.61	14.07	**14.24**	**1.11**	6.66	5.64	0.71	0.28	0.28	0.71	3.21	96.51
515	Andesite	58.35	15.94	11.25	**1.28**	7.09	3.53	0.22	0.30	0.33	0.89	0.50	99.68
516	Andesite	51.67	13.77	**16.91**	**0.98**	3.77	4.74	0.84	0.12	0.30	0.79	7.17	101.07
517	Gabbro	46.33	18.07	12.39	9.55	8.55	1.46	0.22	0.19	0.04	0.57	3.44	100.80
518	Basalt	50.18	15.92	16.38	4.09	**4.65**	2.76	0.44	0.12	0.35	0.94	5.21	101.03
519	Basalt	45.72	16.61	**19.23**	4.83	**1.25**	**1.70**	**2.62**	0.11	0.26	0.75	6.92	100.01
520	Basalt	50.35	**19.57**	11.71	**3.25**	**2.11**	3.67	**3.52**	0.14	0.37	1.01	3.94	99.64
521	Basalt	53.92	13.70	**19.15**	**1.25**	7.29	**1.85**	0.28	0.73	0.35	0.78	0.83	100.13
522	Debris flow (basalt)	**62.89**	16.56	6.71	**3.44**	**1.64**	1.98	**3.09**	0.10	0.28	0.76	2.90	100.35
523	Dacite	62.52	14.21	**9.05**	**0.52**	4.14	4.98	0.30	0.05	0.26	0.65	2.89	99.56
524	Basalt	31.69	13.85	**28.92**	**1.87**	**2.40**	2.68	**2.15**	0.08	0.24	0.64	13.85	98.36
525	Basalt	37.00	16.01	**23.27**	**0.88**	**4.16**	3.71	**1.61**	0.06	0.23	0.66	10.89	98.47
526	Andesite	60.31	15.78	10.48	**1.18**	5.44	2.80	1.57	0.31	0.36	0.89	0.87	99.99
528	Feldspar porphyry	70.99	15.66	1.93	0.36	1.86	5.46	1.98	0.04	0.06	0.24	0.90	99.48
529	Andesite	60.29	16.43	10.20	**1.13**	4.97	4.75	0.86	0.20	0.35	0.92	0.73	100.83
530	Rhyolite	68.64	14.01	**7.06**	0.44	1.50	3.23	2.92	0.02	0.20	0.66	1.20	99.88
531	Andesite	58.02	16.87	9.52	**1.26**	8.73	**2.13**	0.93	0.29	0.36	0.91	1.53	100.55
532	Andesite	59.48	14.83	9.14	**1.29**	4.92	3.27	1.62	0.29	0.28	0.75	4.44	100.31
533	Gabbro	46.36	15.88	13.32	7.99	12.15	1.23	0.34	0.22	0.05	0.77	2.09	100.40
534	Basalt	56.91	14.66	15.08	5.55	**1.84**	**0.43**	0.97	0.39	0.17	0.63	4.54	101.17
535	Basalt	**59.34**	17.35	9.53	**2.30**	**3.64**	3.54	0.87	0.20	0.29	1.37	2.26	100.69
536	Gabbro	47.34	15.17	16.97	6.39	9.31	2.39	0.45	0.27	0.08	1.28	1.70	101.35
537	Gabbro	46.27	17.41	12.16	9.90	10.05	0.74	0.31	0.18	0.04	0.64	3.46	101.16
538	Basalt	51.03	15.99	8.74	**1.21**	17.03	**1.09**	0.07	0.13	0.20	1.21	3.41	100.11
539	Basalt	45.41	16.34	14.12	6.15	12.10	**1.58**	1.01	0.21	0.21	1.30	2.59	101.02
540	Basalt	51.34	14.61	11.54	**1.10**	**5.72**	3.20	**1.92**	0.19	0.32	0.82	2.08	92.84

Bold values are representative of element enrichment or depletion.

Table 11. Average major element geochemistry of rock type, from NEWPET 1987-1992 (file IGNEOUS.xls).

Rock Type	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	MgO %	CaO %	Na_2O %	K_2O %	MnO %	P_2O_5 %	TiO_2 %	LOI %	Total %
Gabbro	50.14	15.48	11.48	7.59	9.58	2.39	0.93	0.12	0.24	1.12	1.86	100.93
Basalt	49.20	15.74	11.71	6.73	9.47	2.91	1.10	0.20	0.35	1.84	2.98	102.23
Andesite	57.94	17.02	7.76	3.33	6.79	3.48	2.45	0.14	0.21	0.87	0.68	100.67
Dacite	65.01	15.91	4.98	1.78	4.32	3.79	2.17	0.09	0.15	0.58	2.50	101.28
Rhyolite	72.82	13.27	2.71	0.39	1.14	3.55	4.30	0.06	0.07	0.28	2.98	101.57

A majority of the samples collected from the property are altered. Element depletion or enrichment is determined by comparing the whole rock geochemistry of samples presented in Table 10 to the average values presented in Table 11. Alteration that is consistent with a volcanogenic massive sulphide environment includes:

- Silicification: a 5% increase in average SiO_2 in basalt samples 513, 522 and 535.
- Sericitization: a 50% increase in average K_2O content is due to potassic metasomatism in a peripheral (distal facies) stockwork environment
- Aluminous alteration: a 3% increase in average Al_2O_3 in basalt sample 520 typifies residual enrichment due to losses of Na_2O and CaO in proximal (vent) alteration facies.

These types of alteration are associated with the sericitic zones in the East and West Striped areas.

- Sulphidization: a 50% increase in average Fe_2O_3 per rock type is typical of stockwork sulphide mineralization

This alteration is associated with rock types that returned anomalous base metal values.

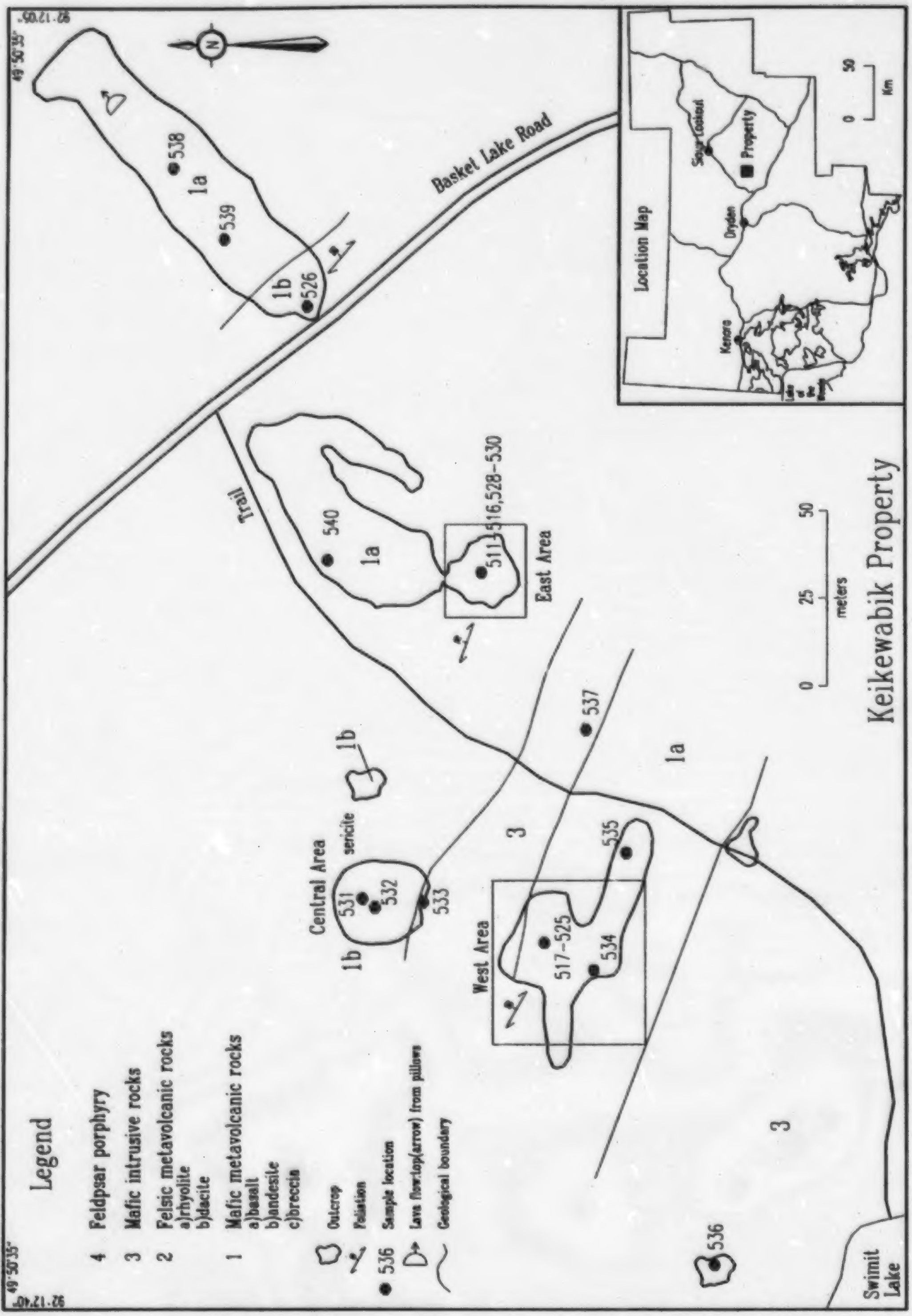
Approximately 50% of the mafic to intermediate metavolcanic rock samples are depleted in sodium (Na_2O), calcium (CaO) and magnesium (MgO). These depleted values represent a 50% element loss compared to the average rock types. Depletion of sodium and calcium is a result of destruction of feldspar and amphibole and/or pyroxene within the hydrothermal system. This system is seen to have been active throughout the depositional history of the property.

Basalt samples 520 and 521 returned elevated Ba and MnO values. Barium dissolves quickly in seawater, hence elevated values in whole rock analysis indicate these volcanic rocks had been close to a discharge zone (vent). This vent alteration exposure is adjacent to the sericite zone in the West Stripped Area.

There is an absence of sulphide, albite, quartz and sericite alteration in the gabbro exposures. Hydrothermal events may be the source of alteration and mineralization in the surrounding extrusive volcanic rocks; however, the lack of mineralization and alteration in the gabbros may indicate that the mafic intrusions are a post-hydrothermal event. The low K_2O and Na_2O values of gabbro samples may be typical of the geochemical composition of these mafic intrusive rocks and not due to hydrothermal alteration.

A grab sample obtained by the prospectors from the intensely altered, mafic metavolcanic rocks of the West Stripped Area returned 520 ppb Au, 69.5 ppm Ag, 3.26% Zn and 1.65% Pb (Kenora Assessment File 52F/16 SE 0017). A grab sample taken by the author in the same area returned 8806 ppm Zn and 6462 ppm Pb (sample 523). Local areas of disseminated sulphide mineralization, including pyrrhotite, sphalerite and galena may be the source of an oval-shaped, airborne magnetic anomaly and coincident electromagnetic conductors reported in the OGS airborne geophysical survey (Ontario Geological Survey 1987).

Historically, the focus has been on gold exploration in this part of the Wabigoon Subprovince. The presence of hydrothermal alteration and sulphide mineralization typical of a volcanogenic massive sulphide environment in this area significantly broadens the exploration base.


Legend
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3 Mafic intrusive rocks
2 Felsic metavolcanic rocks
a)rhyolite
b)dacite
1 Mafic metavolcanic rocks
a)basalt
b)andesite
c)breccia
Outcrop
Foliation
536 Sample location
Lava flow:top(arrow) from pillows
Geological boundary
49°50'35"
92°12'40"
92°12'05"
Basket Lake Road
Trail
1a
1b
3
538
539
526
540
511-516,528-530
East Area
Central Area
sericite
531
532
533
West Area
517-525
534
535
537
536
Swimit Lake
0
25
50
meters
Keikewabik Property
Location Map
Kenora
Dryden
Sioux Lookout
Property
0
50
Km

Figure 9. Geology and sample locations of the Keikewabik property.

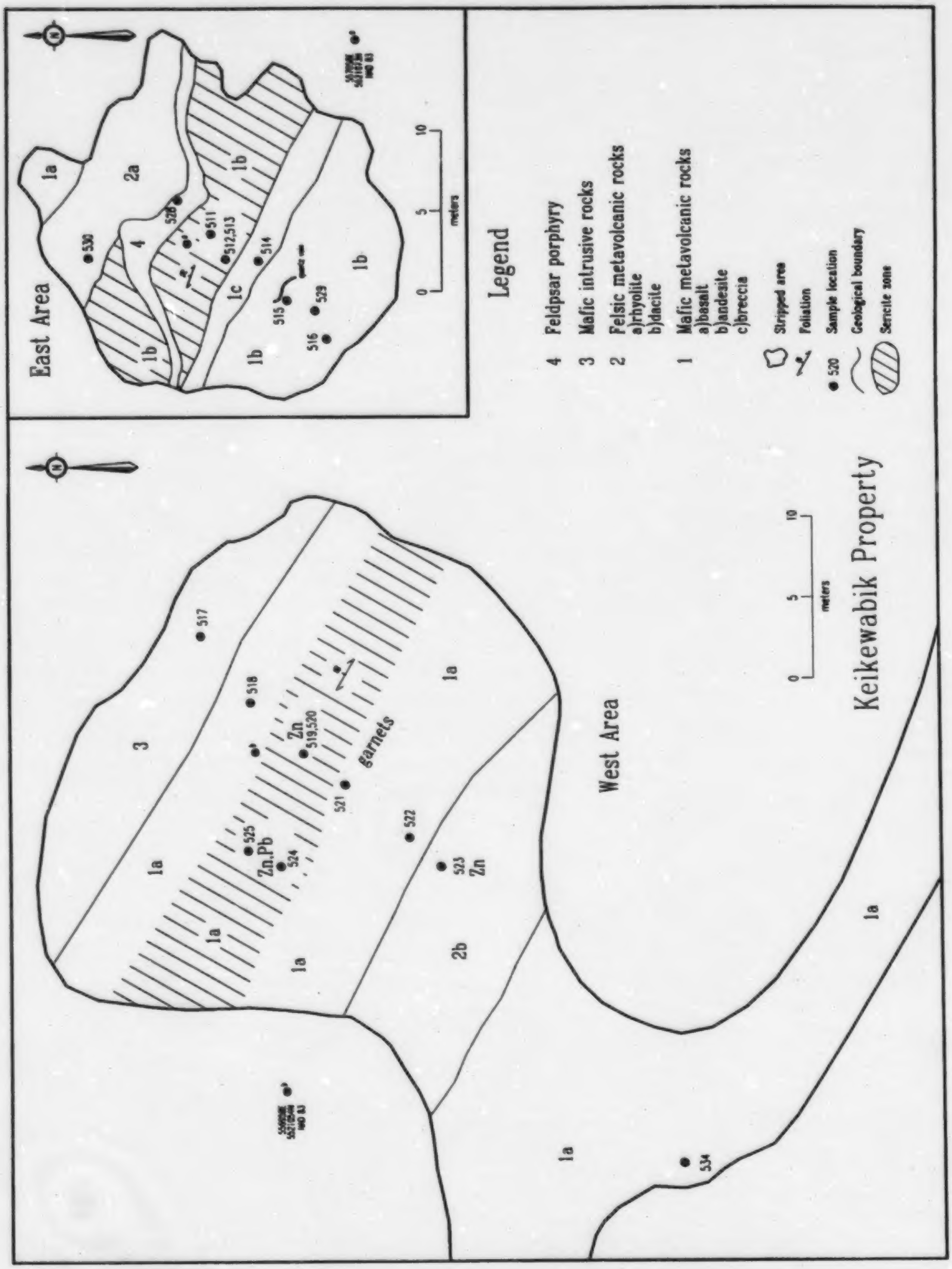

East Area
1a
2a
4
1b
1c
528
511
512,513
514
515
529
516
530
0
5
10
meters
Legend
4 Feldspar porphyry
3 Mafic intrusive rocks
2 Felsic metavolcanic rocks
a)rhyolite
b)dacite
1 Mafic metavolcanic rocks
a)basalt
b)andesite
c)breccia
Stripped area
Foliation
520 Sample location
Geological boundary
Sericite zone
West Area
3
1a
2b
517
518
Zn
519,520
garnets
521
522
525
Zn,Pb
524
523
Zn
534
Keikewabik Property

Figure 10. Geology and sample locations of the Keikewabik property east and west areas.

PIKE LAKE INTRUSION (C. RAVNAAS)

During the summers of 2000 and 2001, the author conducted a reconnaissance mapping and sampling program of the Pike Lake Intrusion. The examination consisted of mapping and sampling all known outcrops within the intrusion. The objective of this program was to evaluate the potential of the intrusion to host platinum group elements (PGE).

The Pike Lake Intrusion is located near the junction of highways 642 and 599 near the hamlet of Silver Dollar. Silver Dollar is located 62 km north of the town of Ignace. Access is provide via paved highways and a network of logging roads and trails.

Table 12. Ontario Geological Survey publications covering the Pike Lake Intrusion.

Year	Publication Title	Publication Number	Author
1968	Geology of the Watcomb Clarkdon Area	P 525	Trowell N.F.
1970	Geology of the Watcomb Area	GR 88 with map 2209	Trowell N.F.
1983	Geology of the Sturgeon Lake Area	GR 221 with map 2458	Trowell N.F.
1983	Geology of the Flying Loon Lake Area	GR 224 with map 2458	Trowell N.F. et al.
1988	Geological Data Inventory Folio	GDIF 439	Ontario Geological Survey
1990	OGS Airborne electromagnetic and magnetic survey	81492, 81493 81501, 81502	Ontario Geological Survey

The Pike Lake Intrusion is situated within the Wabigoon Subprovince. Mafic metavolcanic rocks are located to the north and south, felsic intrusive rocks of the Beidelman Bay Intrusion are located to the east and felsic intrusive rocks of the Shanty Lake Pluton are located west of the Pike Lake Intrusion. The Pike Lake Intrusion is composed of mafic intrusive rocks with numerous quartz veins and localized shear zones. Trowell (1983) described the intrusion as multi-phased and differentiated: "The author has interpreted the Pike Lake Pluton to be a subvolcanic intrusion emplaced within, but near the top of a lower series of dominantly thoeliitic mafic metavolcanics." Trowell also states " The intrusion is composed of several phases that are texturally distinct but also exhibit compositional differences." Davies and Trowell (1982) determined U/Pb zircon ages of 2732.7 Ma for the Pike Lake Intrusion and 2720.5 and 2733.8 Ma for the Beidelman Bay Intrusion.

Previous mineral exploration has concentrated on the copper-gold mineralization in the northern half of the intrusion. Outcrop and diamond drill hole samples taken during base metal exploration were not analyzed for PGE content. Diamond drill hole BC 16A returned 0.77% Cu over 3 m at the Keevil occurrence (Kenora Assessment Files 52G/14SE 0014). The southern half of the intrusion has received limited exploration work. Table 13 lists the exploration work conducted on the Pike Lake Intrusion.

The Pike Lake Intrusion can be divided into a northern zone composed of leucocratic gabbro and a southern zone composed of gabbro to melanocratic gabbro. Figure 11 illustrates the geology and sample locations and Table 14 presents the major element geochemistry of collected samples.

The northern zone consists of gabbro and quartz diorite mafic intrusive rocks that are intruded by felsic intrusive rocks. These mafic intrusive rocks are vari-textured, and consist of a predominantly fine-grained, gray to black matrix with varying content of medium- to coarse-grained, white plagioclase crystals. South of the felsic intrusion the mafic intrusive rocks contain disseminated, 1 cm diameter white-blue quartz eyes.

In the northeast part of the intrusion, 1.5 km north of Pike Lake, felsic intrusive rocks are exposed along Highway 599. Disseminated pyrite and chalcopyrite in a 2 m wide shear zone returned >1000 ppm Cu (sample 5). The presence of sulphide mineralization in the quartz veins, shear zones and adjacent mafic intrusive rocks originated at the same time as the felsic intrusive rocks located the within the Pike Lake Intrusion and the eastern Beidelman Bay Intrusions (Trowell 1968). Pyrite, chalcopyrite and pyrrhotite are associated with the silicified felsic intrusive rocks of the Beidelman Bay Intrusion (Trowell 1974).

Table 13. Previous exploration conducted on the Pike Lake Intrusion.

Year	Company / Individual	Exploration Activity*	Kenora Assessment File
1965	Keevil Mining Group. Ltd.	GM, GEM	52G/14SE 58A-1
1966	Steep Rock Iron Mines	GL, GM	52G/14SE 22
1970	Chimo Gold Mines Ltd.	AEM, AM, GM, GEM	52G/14SE 44, 47B-1
1970	Madsen Red Lake Gold Mines	GEM	52G/14SE 55
1970-71	Mid-North Engineering	GL, AEM, AM, DD 2 to 65 m, SA	52G/14SE 27D-1, 45B-1, 57
1970	Noranda Exploration Co. Ltd.	DD 2 to 267m, SA	52G/14SE 34B-1
1970	Scurry-Rainbow Oil Ltd.	GM, GEM, DD 5 to 789 m, SA	52G/14SE 16 52G/14NW 19,20
1971	Amalg Rare Earth Mines	GL	52G/14SE 74B-1
1971	Madsen Red Lake Gold Mines	DD 3 to 181 m, SA	52G/14SE 29C-1, 31C-1
1971	Scurry-Rainbow Oil Ltd.	GM, GEM, DD 6 to 189 m, SA	52G/14NW 24A-1 52G/14SE 24A-1
1971-73	Scurry-Rainbow Oil Ltd.	DD 6 to 812 m, SA	52G/14SE 14,15
1972	Madsen Red Lake Gold Mines	GL, SA	52G/15SE 26
1972	Mid-North Engineering	DD 2 to 115 m, SA	52G/15SE 31A-1
1975	Noranda Exploration Co. Ltd.	GL, GM	52G/14SE 51A-1
1976	Noranda Exploration Co. Ltd.	DD 1 to 106 m, SA	52G/15SE 11B-1
1980	Seagull Resources Ltd.	AEM, AM	52G/14SE 84
1990	Johnson, S. Read, B.	Tr, GL, SA	52G/14SE 84

**See Table 1 for explanation of abbreviations.*

The Keevil occurrence (*see* Figure 11) consists of a 1 m wide shear zone in diorite with vein, stringer and patchy chalcopyrite mineralization. Pervasive silicification and quartz veining are noted in the shear zone (Kenora Assessment File 52G/14SE 0058A-1). A possible source of the felsic intrusive rocks and copper mineralization along the shear zones at the Keevil occurrence and at sample 5 is the Beidelman Bay Intrusion.

The southern zone consists of vari-textured mafic intrusive rocks. These consist of a fine-grained black matrix with a varying content of medium- to coarse-grained white plagioclase crystals.

The plagioclase crystals in the mafic intrusive rocks generally are randomly orientated except near the western part of the Pike Lake Intrusion where plagioclase alignment and possible cumulate layering are observed. An intermittent compositional layering of medium- to coarse-grained, white plagioclase gabbro and plagioclase-barren gabbro is located in a flat-lying outcrop near sample 30 (GPS location 625407 E, 5518537 N). The strike of the cumulate layering is 040°.

Plagioclase dominant gabbro with 15% fine-grained, round, mafic xenoliths is located at sample locations 23 and 24. This exposure of xenolithic gabbro is located north of a melanocratic gabbro unit (*see* Figure 11).

Randomly orientated, 1 to 5 cm wide quartz veins have intruded the mafic intrusive rocks. The quartz veins have caused localized silicification of the adjacent wall rock. Quartz vein samples 15 and 18 were analyzed to determine the possibility of PGE remobilization.

Several 1 to 1.5 m wide, aphanitic, massive, weakly chloritized, mafic dikes are located near samples 25, 26 and 30. The mafic dikes intrude the mafic intrusive rocks along a trend of 040° corresponding to the interpreted cumulate plagioclase crystal layering.

The dominant features of the melanocratic gabbro samples 16, 26, 29 and 20 are elevated TiO_2 values. Examination of rock samples has determined the source of Ti is the ilmenite content. These mafic intrusive rocks contain 1 to 5% disseminated pyrite and pyrrhotite (*see* Figure 11, Table 15).

Sample 19, a pristine medium-grained gabbro with 5% coarse-grained, white plagioclase, returned a value of 12.23 weight % MgO. West of this sample location, in the same outcrop, silicified gabbro in samples 20 and 21, returned 9.8 and 7.9 weight % MgO, respectively. This outcrop returned the highest MgO values of the Pike Lake Intrusion outcrops examined and may represent the original ultramafic phase of the intrusion.

East of Pike Lake and exposed along Highway 599 are siliceous metavolcanic rocks. These are fine-grained, gray-black basalts. Several quartz veins (>2 cm wide) with 1 to 5% pyrite and pyrrhotite have intruded this unit. The quartz veins strike 050° and dip 60°N, similar to the quartz veins in the north part of the intrusion. Magnetism of this unit is variable and not specifically associated with the sulphide mineralization as noted in the mafic intrusive rocks in the western part of the intrusion.

The trend of the cumulate layering at sample 30 and the trend of the mafic dikes at samples 27 and 28 in the southwest portion is similar to the trend of the quartz veins and shear zone in the northeast portion of the intrusion (*see* Figure 11). These trends are parallel to the compositional units and structural trends of the intrusion. No significant PGE values were obtained during this field examination, but compositional changes and textural trends would assist the mineral explorationist during prospecting of the Pike Lake Intrusion.

Table 14. Major element geochemistry of samples collected from the Pike Lake Intrusion.

Sample	Rock Type	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	MgO %	CaO %	Na_2O %	K_2O %	MnO %	P_2O_5 %	TiO_2 %	LOI %	Total %
1	Leucogabbro	52.99	17.59	8.83	4.27	7.64	2.81	0.38	0.09	0.14	0.97	3.97	99.68
2	Leucogabbro	53.55	17.32	7.96	5.98	8.51	2.99	0.50	0.16	0.06	0.51	2.47	100.01
3	Tonalite	74.28	12.84	2.53	0.86	1.46	2.13	2.19	0.03	0.01	0.29	1.98	98.61
4	Gabbro	51.44	17.82	9.79	4.95	9.95	3.12	0.21	0.17	0.16	1.08	1.66	100.36
5	Tonalite	75.70	12.91	1.87	0.43	2.46	4.62	0.32	0.03	0.11	0.26	0.61	99.31
6	Leucogabbro	51.95	20.76	7.54	3.14	9.77	2.62	0.14	0.09	0.10	0.81	3.33	100.25
7	Quartz diorite	59.22	15.46	11.16	1.76	6.68	2.18	0.53	0.15	0.29	1.53	0.95	99.93
8	Leucogabbro	51.94	21.63	8.15	2.15	7.31	4.11	0.59	0.11	0.15	0.97	2.89	99.99
9	Gabbro	48.97	18.02	13.43	4.40	8.47	2.50	0.73	0.18	0.15	1.71	1.77	100.34
10	Leucogabbro	53.75	18.96	8.13	3.91	9.36	3.15	0.46	0.12	0.18	0.69	1.46	100.18
11	Melagabbro	46.46	15.86	15.51	5.98	9.36	2.17	0.68	0.19	0.06	1.71	2.53	100.50
12	Leucogabbro	52.80	18.60	8.39	4.92	6.14	4.69	0.91	0.08	0.07	0.86	3.31	100.76
13	Melagabbro	47.62	17.31	12.06	7.34	11.64	1.44	0.16	0.18	0.03	1.02	2.03	100.82
14	Gabbro	52.13	17.18	8.85	7.56	9.14	2.61	0.31	0.12	0.06	0.50	2.51	100.97
15	Quartz vein	98.02	0.82	0.55	0.07	0.05	0.01	0.01	0.01	0.01	0.02	0.31	99.84
16	Melagabbro	43.04	16.98	19.08	5.45	9.16	2.19	0.66	0.17	0.10	2.31	1.12	100.26
17	Gabbro	52.19	15.73	9.76	8.60	11.34	2.04	0.30	0.18	0.08	0.64	0.18	101.04
18	Quartz vein	98.05	1.53	0.31	0.02	0.07	0.02	0.01	0.01	0.01	0.02	0.18	100.23
19	Melagabbro	46.30	14.30	13.00	12.23	9.10	1.25	0.28	0.21	0.01	0.37	3.10	100.16
20	Gabbro	49.64	15.87	10.76	9.83	9.33	1.60	0.14	0.17	0.06	0.51	2.71	100.60
21	Gabbro	50.68	15.59	10.66	7.96	10.91	2.32	0.28	0.17	0.06	0.74	1.42	100.79
22	Gabbro	50.20	17.33	12.40	5.29	10.01	2.55	0.30	0.17	0.15	1.07	1.35	100.82
23	Leucogabbro	54.41	15.25	12.78	3.00	8.10	3.93	0.33	0.25	0.33	1.62	0.89	100.89
24	Leucogabbro	52.65	15.65	14.70	3.50	7.13	5.23	0.29	0.25	0.22	1.26	0.25	101.12

Sample	Rock Type	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	MgO %	CaO %	Na_2O %	K_2O %	MnO %	P_2O_5 %	TiO_2 %	LOI %	Total %
25	Leucogabbro	54.88	16.23	10.16	5.08	8.33	2.92	0.96	0.15	0.17	0.88	1.03	100.79
26	Gabbro	51.73	15.30	13.29	6.58	7.87	3.07	0.71	0.19	0.09	0.59	1.47	100.88
27	Melagabbro	45.79	18.75	15.57	3.17	8.63	3.17	0.82	0.20	0.91	2.43	0.77	100.22
28	Quartz vein	87.51	4.34	2.64	1.05	2.23	0.04	0.01	0.04	0.01	0.08	2.50	100.45
29	Gabbro	48.30	15.56	15.04	4.89	9.61	2.90	0.28	0.20	0.12	3.57	0.33	100.81
30	Melagabbro	43.76	14.96	18.06	6.63	9.54	1.85	0.73	0.23	0.06	3.15	1.06	100.03
31	Basalt	74.61	13.06	3.40	0.81	1.43	2.63	2.10	0.03	0.03	0.32	1.10	99.52
32	Quartz vein	80.69	7.57	5.16	0.31	0.82	1.79	0.57	0.01	0.02	0.16	2.21	99.30
33	Basalt	71.73	13.74	6.11	0.24	1.42	3.79	1.03	0.03	0.04	0.38	0.96	99.48
34	Basalt	64.51	13.25	7.22	2.45	3.87	2.83	2.11	0.11	0.34	0.72	2.18	99.58
35	Basalt	68.31	12.57	6.23	1.75	3.01	1.47	3.11	0.10	0.09	0.66	2.17	99.47
36	Basalt	68.60	12.98	8.80	1.79	0.82	0.36	4.10	0.10	0.02	0.35	2.23	100.13

Table 15. Selected assay results of samples collected from the Pike Lake Intrusion.

Sample	Sample Description	Au ppb	Pd ppb	Pt ppb	Cu ppm	Ni ppm	Ti ppm	Mg ppm	UTM NAD 27
1	Leucogabbro 1% py	N.D.	N.D.	N.D.	259	74	NA	NA	629887 E 5521618 N
2	Leucogabbro 1% py	N.D.	N.D.	N.D.	81	128	NA	NA	630130 E 5521400 N
3	Tonalite 1-5% py, po	N.D.	N.D.	N.D.	348	15	NA	NA	630130 E 5521400 N
4	Gabbro 1-3% py, po	N.D.	N.D.	N.D.	200	67	NA	NA	630130 E 5521400 N
5	Tonalite 1% py, malachite	7.56	N.D.	N.D.	>1000.00	48	NA	NA	630130 E 5521400 N
6	Leucogabbro 1% py	N.D.	N.D.	N.D.	41	65	NA	NA	629598 E 5521489 N
7	Quartz diorite 1-5% py, po	N.D.	N.D.	N.D.	306	10	NA	NA	629317 E 5521234 N
8	Leucogabbro 1-5% py, po	N.D.	N.D.	N.D.	220	37	NA	NA	630113 E 5521000 N
9	Gabbro 3-5% py, po	N.D.	N.D.	N.D.	337	63	NA	NA	630181 E 5520971 N
10	Leucogabbro 1% py, po	N.D.	N.D.	N.D.	199	55	NA	NA	630154 E 5520875 N
11	Melanogabbro 1-3% py, po	5.16	N.D.	N.D.	248	50	NA	NA	630350 E 5519180 N
12	Leucogabbro 1% py	N.D.	N.D.	N.D.	21	63	4122	30357	631500E 5518758 N
13	Melanogabbro 1% py, po	N.D.	N.D.	N.D.	118	84	NA	NA	628664 E 5519566 N
14	Gabbro 1% py	N.D.	N.D.	N.D.	20	143	2493	47570	628413 E 5518385 N

Sample	Sample Description	Au ppb	Pd ppb	Pt ppb	Cu ppm	Ni ppm	Ti ppm	Mg ppm	UTM NAD 27
15	Quartz vein 1% py	N.D.	N.D.	N.D.	27	10	NA	NA	627852 E 5518932 N
16	Melanogabbro 5% py, po	N.D.	N.D.	N.D.	454	110	NA	NA	627883 E 5518944 N
17	Gabbro 1% py, po	N.D.	N.D.	N.D.	148	122	NA	NA	626914 E 5518614 N
18	Quartz vein 1% py	N.D.	N.D.	N.D.	3	N.A.	NA	NA	626914 E 5518614 N
19	Melanogabbro 1% py	N.D.	N.D.	N.D.	12	301	1576	69331	626845 E 5518477 N
20	Gabbro 1-3% py, po	9.89	8.28	N.D.	396	225	2086	57398	626845 E 5518477 N
21	Gabbro 1% py	N.D.	N.D.	N.D.	64	94	3644	50689	626845 E 5518477 N
22	Gabbro 1% py, po	N.D.	N.D.	N.D.	40	78	NA	NA	626845 E 5518477 N
23	Leucogabbro 1% py	N.D.	N.D.	N.D.	31	43	7949	16487	626308 E 5518520 N
24	Leucogabbro 1% po	N.D.	N.D.	N.D.	22	67	6012	21667	626308 E 5518520 N
25	Leucogabbro 1% py	N.D.	N.D.	N.D.	44	75	4637	32294	626107 E 5518529 N
26	Gabbro 1% py	N.D.	N.D.	N.D.	4	116	3043	43258	626107 E 5518529 N
27	Melanogabbro 5% py, po	N.D.	N.D.	N.D.	152	5	NA	NA	626140 E 5518507 N
28	Quartz vein 1% py	N.D.	N.D.	N.D.	4	6	NA	NA	626140 E 5518507 N
29	Gabbro 1% py	N.D.	N.D.	N.D.	46	8	>13000	33182	625606 E 5518531 N
30	Melanogabbro 1-3% py, po	N.D.	N.D.	N.D.	142	8	NA	NA	625365 E 5518546 N
31	Basalt 1% py, po	N.D.	N.D.	N.D.	244	N.A.	NA	NA	630975 E 5518795 N
32	Quartz vein 1-5% py, po	7.22	N.D.	N.D.	425	11	NA	NA	630975 E 5518795 N
33	Basalt 1% py, po	17.19	N.D.	N.D.	396	N.A.	NA	NA	630975 E 5518795 N
34	Basalt 1% py, po	26.63	N.D.	N.D.	230	21	NA	NA	630975 E 5518795 N
35	Basalt 1-3% py, po	N.D.	N.D.	N.D.	119	6	NA	NA	630975 E 5518795 N
36	Basalt 1% py, po	6.36	N.D.	N.D.	345	N.A.	NA	NA	630975 E 5518795 N

N.A. not analyzed
N.D. not detected

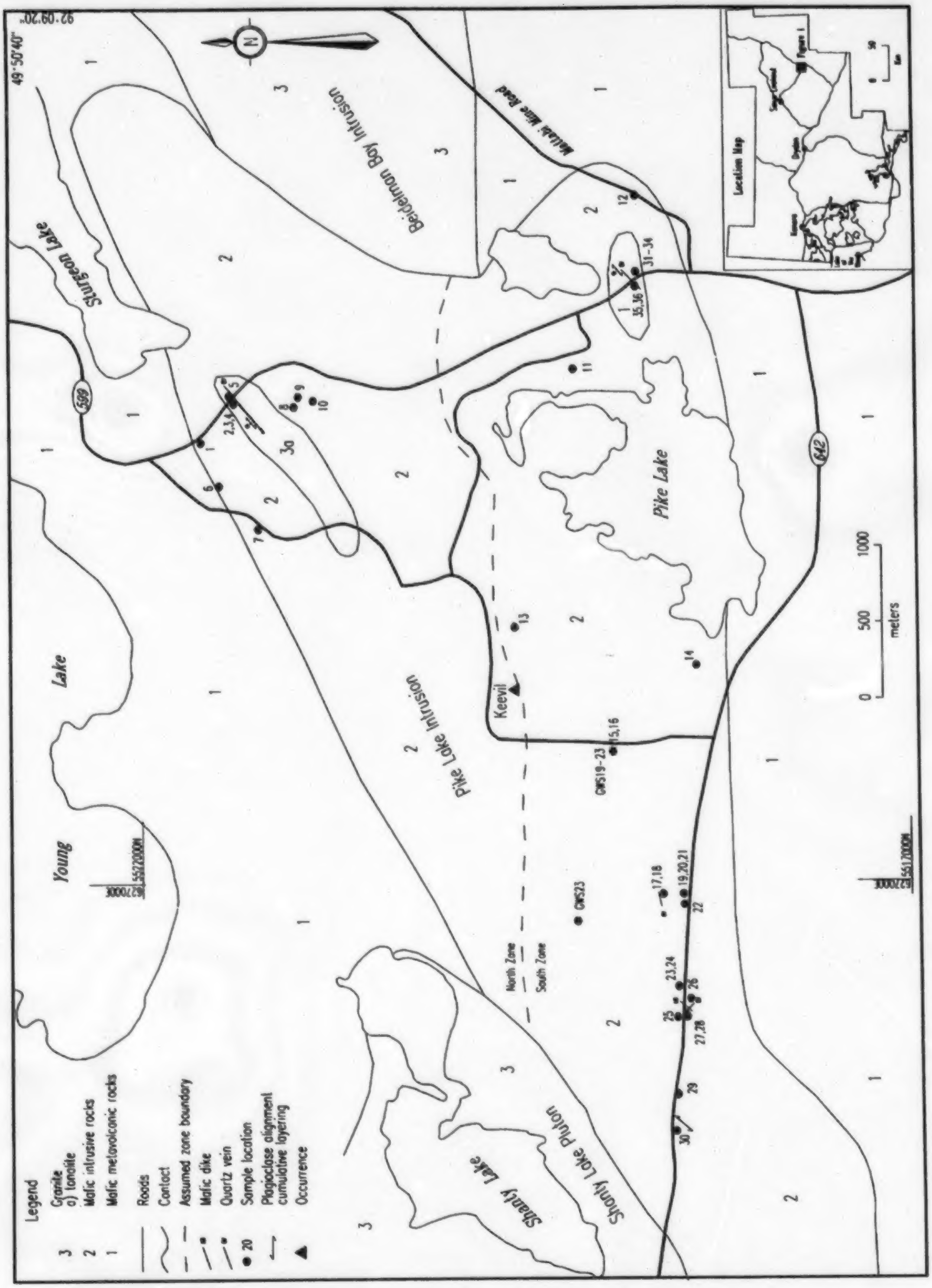

Legend
3 Granite a) tonalite
2 Mafic intrusive rocks
1 Mafic metavolcanic rocks
Roads
Contact
Assumed zone boundary
Mafic dike
Quartz vein
● 20 Sample location
Plagioclase alignment cumulative layering
▲ Occurrence
Young Lake
Sturgeon Lake
Beidelman Bay Intrusion
Pike Lake Intrusion
Pike Lake
Shanty Lake
Shanty Lake Pluton
Mattabi Mine Road
599
642
Keevil
North Zone
South Zone
N
49°50'40"
92°09'20"
0
500
1000
meters
Location Map

Figure 11. Geology and sample locations of the Pike Lake Intrusion (*modified after* Trowell 1983).

PLOMP FARM GOLD-COPPER-ZINC PROPERTY, WABIGOON LAKE (A. RAOUL)

During the summer of 2001, the author conducted a surface and drill core sampling program of the Plomp Farm property located north of Wabigoon Lake. The objective of this program was to evaluate the potential of the area to host volcanogenic massive sulphide (VMS) mineralization through systematic sampling, lithogeochemical analysis and alteration studies.

The study area is located 10 km west of Dryden, Ontario (52 F/14SE). Access is gained by travelling 3.0 km south, from Highway 17, on the Minnitaki South Road. The property was previously examined for gold mineralization by Champion Bear Resources Limited from 1994–1996. The property is owned by Mr. F. Plomp, Dryden, who retains both surface and mining rights. The property consists of Patented Land Ref 180053, Ref 106200, Ref 82778, Ref 77164, Ref 98238 and 5300 Vet 1901.

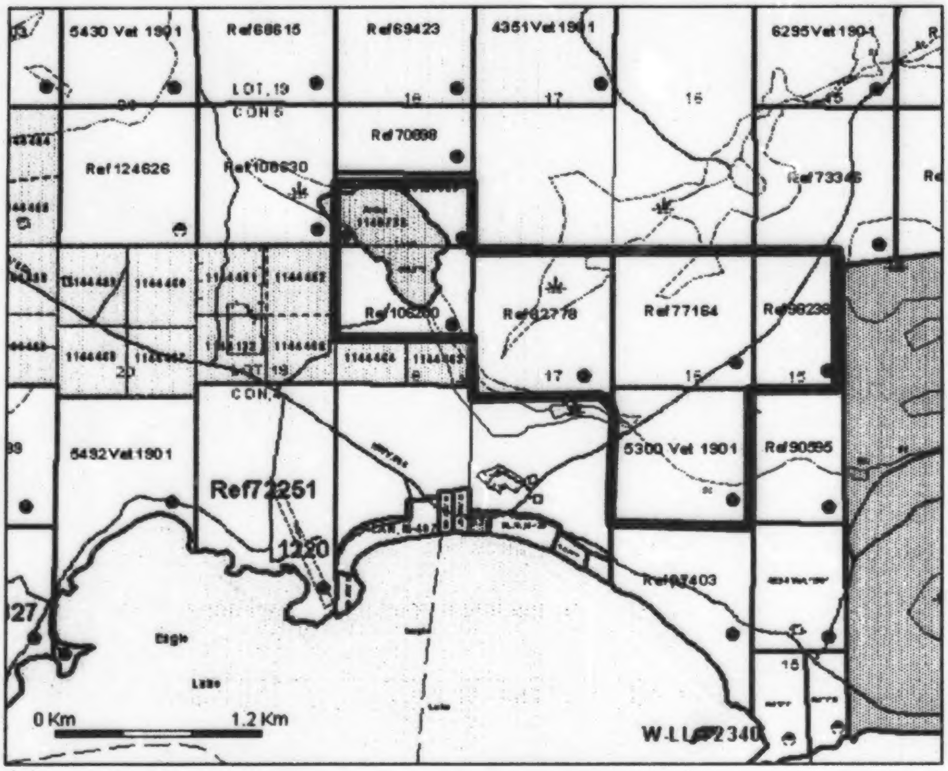

5430 Vet 1901
Ref68615
Ref69423
4351Vet1901
6295Vet1901
LOT 19
CON 5
Ref70698
Ref124626
Ref106630
Ref73345
Ref106200
Ref82778
Ref77164
Ref98238
CON 4
5432Vet1901
Ref72251
1220
5300 Vet 1901
Ref90595
Ref97403
Eagle
Lake
0 Km
1.2 Km
W.L.L.P2340

Figure 12. Location of the Plomp Farm property (December 1, 2001).

Table 16. Previous exploration work and studies conducted on the Plomp Farm property.

Year	Company	Type of Work	Results
1991	Hailstone, MNDM	13 samples of quartz-tourmaline veins in metasediments.	Best assays: 3.41-34.93 g/t gold and 0.27% Cu.
1991	Teck Corporation	14 samples of biotite-quartz eye gneiss with minor pyrite.	Best assays: 1.15-1.57 g/t gold in quartz +/- py, po, tourm
1992	MNDM	XRD of unidentified mineral	ID: zinc spinel located
1992	Laderoute, MNDM	Property study:	
		Main Showing - quartz-tourmaline vein in metasediments	No significant assays.
		North Showing - 5 m zone of sericitic felsic tuff with quartz-py-po +/-sph-cpy	Best assays: 3.73 g/t gold (grab)
		West Showing - biotite-sericite altered rhyolite/chert with 20% sph +/-py-cpy	3 samples - 0.43 g/t gold, 0.03-0.07% Cu, 0.25-0.75% Zn.
		South Showing - <1m zone of magnetite bearing chert with garnet-grunerite	No significant assays.
1992	Minnova	4 samples of metasediment with andalusite and quartz veins +/-py-po-tourmaline	Best assays: 1.15-1.57 g/t gold with whole rock analysis.
	F. Plomp	3 samples of similar material	Whole rock showed albitization and silicification.
1994	Blackburn MNDM	Property inspection of Champion Bear Resources - performing an IP Survey	East Zone - foliated felsic volcanic with 4.56 g/t gold and 0.25% Zn. West Zone - felsic volcanic with minor sph-py.
1995	Blackburn MNDM	Property inspection of Champion Bear Resources - performing line-cutting, mapping, Mag and IP surveys and 26 ddh (5295 m).	Mineralized zone traced >700 m along strike; 36 m width. Drill hole PF26 intersected 2.5 m of anomalous Cu-Zn-Au-Ag.
1996	Champion Bear Resources	Ground geophysics (VLF and Mag) located 4 linear features on Plomp East property.	Drilling found metasediments with banded chert-magnetite iron formation.

A geology map of the property was prepared by this author from 75 of the 86 Champion Bear Resources Limited drill logs (Figures 14 and 15). The focus of this review was a comparison of the altered versus unaltered units and those that had mineralization associated with VMS deposition (gold, zinc, silver). No whole rock geochemical data by Champion Bear Resources could be located (Kenora Assessment Files 52F/14SE E-4). Twenty-three samples of diamond drill core were taken by the author to test for VMS alteration and mineralization (Figure 13; Table 19 and 20).

The stratigraphy of the property consists of a series of southerly, sub-vertical to vertically dipping, felsic volcanic rocks, iron formations and metasediments that are intruded by mafic to felsic dike rocks.

The following geological units were delineated (*see* Figures 14 and 15):

Unit 1 : Felsic to Intermediate Volcanic Rocks (rhyolite, dacite and minor andesites)
Fine-grained, grey to light grey, weakly foliated, felsic tuffs with minor flows. Samples 745472 (dacitic tuff) and 745473 (andesite/basalt) are examples of this unit.

Unit 2 : Quartz Sericite Schist (altered rhyolite or dacite tuffs with pyrite)
Fine-grained, off-white to light grey, strongly foliated, strongly altered felsic tuff and 1 to 5% pyrite. Sample 745470 (quartz sericite schist) is an example of this unit.

Unit 3 : Iron Formation: chert-magnetite
Fine-grained, grey, moderately foliated, recrystallized chert with 15 to 20% bands of magnetite-chlorite and minor stringers of pyrite (<2%) and traces of chalcopyrite. These are intercalated within the felsic volcanic unit 2 and may represent a "cap rock" or exhalite of the VMS sequence. Sample 745471 (magnetite-chlorite-bearing chert) is an example of this unit.

Unit 4 : Iron Formation: chert-pyrite
Fine-grained, grey, weakly foliated, recrystallized chert (or possible felsic volcanic) with 3 to 5% disseminated pyrite. Sample 745468 (pyritic chert or siliceous felsic volcanic with pyrite) is an example of this unit.

Unit 5 : Metasedimentary Rocks (greywacke, arkose or argillite)
Fine-grained, light grey to grey, weakly foliated, metagreywacke to arkose with trace pyrite. Sample 745469 (metagreywacke) is an example of the Warclub Group.

Unit 6 : Gabbro (diabase)
Fine-grained, dark grey to black, equigranular, magnetic gabbro or diabase with 1% disseminated pyrite.

The following descriptions are from Champion Bear Resources Limited (Kenora Assessment Files 52F/14SE E-4) drill logs. No samples were taken or any significant examination of these units was done.

Unit 7 : Felsic Intrusive Rocks (granite)
Medium-grained, grey, weakly foliated, massive to weakly porphyritic, intrusive rock of granodiorite to diorite composition.

Unit 8 : Porphyry (quartz-feldspar or feldspar)
Fine-grained, grey, poorly foliated to massive porphyry of granodiorite to diorite composition with 2 mm feldspar phenocrysts (3 to 10%).

Unit 9 : Pegmatites
The pegmatite dikes consist of coarse-grained, white to pale green, massive crystals of feldspar and quartz with minor amounts (<5%) of muscovite-tourmaline and 1% pyrite. Also present are trace amounts of lepidolite and anthophyllite.

Values in Table 19 were used to calculate the Ore Score. The Ore Score is a quantitative rating system of comparing alteration and mineralization (Raoul and Masson 1998). The higher the Ore Score value the greater the indication of hydrothermal alteration and presence of base metal mineralization (Table 17). Formulas shown in Table 18 were used to determine the Ore Score of selected alteration samples. The calculated values are presented in Table 21.

Table 17. Ore score, alteration index, metal index and VMS mineralization potential ratings (Raoul and Masson 1998).

Ore Score Alteration Index + Metal Index	**Alteration Index (0-9) Hashimoto Index + Sericite Index + Chlorite Index**	**Metal Index (0-11) (Cu + Zn + Ag mineralization) + Spitz Index**	**VMS Mineralization Potential**
0-3	Low	Low	Nil
4-6	Moderate	Moderate	Low
7-9	High	High	Low-moderate
10-12	-	Very high	Moderate
13-15	-	-	Moderate-high
16-18	-	-	High
19-20	-	-	Very high

Table 18. Index, index formulas and metal score values.

Index	Index Formula	Score 1	Score 2	Score3
Hashimoto Index	$(MgO+K_2O) / (MgO+K_2O+ Na_2O+CaO)100$	>70	>80	>90
Sericite Index	$(K_2O) / (Na_2O+K_20)100$	>70	>80	>90
Chlorite Index	$(MgO+F_2O_3) / (MgO+Fe_2O_3+2CaO+2Na_2O)100$	>70	>80	>90
Spitz Index	Al_2O_3 / Na_2O	>25	>50	-
Cu and Zn		>100 ppm	>1000 ppm	>5000 ppm
Ag		> 1 ppm	>2 ppm	>5 ppm

Table 19. Major element geochemistry and Cu, Zn, Ag assays from the Plomp Farm property.

Sample	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	CaO %	MgO %	Na_2O %	K_2O %	MnO %	P_2O_5 %	TiO_2 %	LOI %	Ba %	Cu ppm	Zn ppm	Ag ppm
745468	57.80	13.82	12.12	5.76	2.78	0.41	1.48	0.12	0.45	0.33	5.31	0.01	302	70	<1
745469	64.05	16.45	6.89	1.74	2.66	1.98	3.46	0.07	0.11	0.59	2.35	0.07	13	65	<1
745470	63.66	21.86	1.49	0.73	0.58	1.65	5.22	0.01	0.04	0.27	2.77	1.24	2	22	<1
745471	66.83	2.24	28.06	2.22	1.85	0.11	0.06	0.08	0.12	0.04	0.01	0.01	11	46	<1
745472	55.99	12.43	24.64	1.77	4.84	0.61	0.26	0.25	0.08	0.51	0.95	0.01	85	87	<1
745473	59.34	16.61	11.45	2.17	3.56	2.93	2.76	0.07	0.11	0.64	1.15	0.05	6	79	<1
1	71.18	14.42	2.54	0.32	1.24	1.50	2.84	0.01	0.11	0.48	2.21	1.28	44	55	2
2	75.64	14.84	1.48	0.28	0.43	0.73	3.72	0.01	0.09	0.28	2.58	0.26	133	119	7
3	74.11	12.98	3.34	0.39	0.85	1.11	2.70	0.01	0.09	0.30	3.24	0.37	202	591	5
4	52.89	1.87	41.24	3.48	2.33	0.33	0.08	0.06	0.10	0.06	0.01	0.02	3	49	3
5	70.26	17.07	2.03	2.32	0.51	4.32	1.52	0.03	0.06	0.32	1.19	0.05	13	47	2
6	70.53	16.72	1.72	0.15	0.49	0.79	3.64	0.01	0.06	0.21	2.87	>2.00	102	245	5
7	69.61	16.07	4.50	0.22	1.31	1.28	2.85	0.03	0.13	0.45	2.86	0.16	87	48	3
8	73.87	14.96	2.12	0.11	0.44	0.29	4.19	0.01	0.06	0.24	2.89	0.23	729	51	7
9	61.65	17.28	7.44	0.52	1.63	0.91	3.54	0.02	0.20	0.45	5.07	0.11	4239	249	10
10	69.64	15.99	1.87	1.95	1.81	2.11	2.94	0.04	0.07	0.25	2.17	0.14	1190	51	4
11	73.79	16.12	1.74	0.28	0.45	0.83	3.56	0.01	0.07	0.26	3.07	0.08	173	45	3
12	70.74	12.53	5.63	2.32	1.59	0.90	2.67	0.06	0.11	0.37	3.08	0.08	165	1491	2
13	71.21	17.04	1.71	1.17	1.08	1.77	2.69	0.04	0.09	0.28	2.36	0.07	101	90	3
14	57.10	22.39	4.64	0.51	0.82	1.27	5.94	0.02	0.05	0.37	4.98	0.25	994	7873	8
15	54.03	13.40	6.99	5.54	4.42	0.41	4.48	0.12	0.08	0.37	2.49	1.57	433	1869	9
16	65.66	17.22	5.15	0.39	2.33	0.44	4.34	0.03	0.11	0.42	3.59	0.13	327	338	4
17	71.22	16.46	4.36	0.65	1.98	1.24	2.85	0.05	0.13	0.60	1.69	0.13	148	607	2
18	69.75	15.22	4.95	0.32	1.74	1.15	3.10	0.03	0.11	0.55	3.23	0.18	67	85	3
19	68.07	16.03	6.08	0.77	2.96	1.45	2.36	0.05	0.11	0.58	2.50	0.24	208	58	3
20	69.37	16.20	2.91	3.42	1.53	1.55	2.94	0.08	0.09	0.39	1.39	0.07	19	168	3
21	69.03	16.92	2.26	3.79	0.81	4.81	1.30	0.03	0.07	0.28	0.80	0.03	6	49	2
22	57.97	7.37	27.43	4.03	2.06	1.21	0.57	0.10	0.14	0.25	0.05	0.14	9	46	3
23	48.20	13.06	18.23	8.31	3.88	2.48	1.57	0.27	0.42	2.94	1.13	0.08	54	183	3

Table 20. Plomp Farm Property rock descriptions and geochemical interpretations.

Sample	Rock Type	Enrichment	Depletion	Alteration
745468	Felsic tuff (dacite) with 10-12% py, 2-3% garnet and <2% grunerite	Fe_2O_3	Na_2O, K_2O	Garnet, grunerite
745469	Metasediment (greywacke) with 2-15% cordierite	MgO	CaO, Na_2O	Cordierite
745470	Quartz sericite schist (dacite)	Ba, Al_2O_3	Fe_2O_3, Na_2O, MgO, CaO	Sericite
745471	Chert with 35% magnetite-chlorite	Fe_2O_3	Nil	Magnetite, chlorite
745472	Felsic tuff (andesite) with 5-7% anthophyllite, 5-7% garnet and 1-2% biotite	Fe_2O_3	Al_2O_3, CaO, K_2O, Na_2O	Garnet, Anthophyllite
74547	Basalt (andesite) with 5-8% garnet	Fe_2O_3	CaO, K_2O	Garnet
1	Silicified felsic tuff (dacite) with 1-2% py-cpy	Ba, SiO_2, MgO	Na_2O, K_2O	Silicification
2	Quartz sericite schist (rhyolite) with 1% py	Ba	Na_2O	Sericite
3	Quartz sericite schist (rhyolite) with 1% py-cpy-sph	Ba	Na_2O	Sericite
4	Chert with 40-50% magnetite-chlorite	Fe_2O_3	Nil	Magnetite, chlorite
5	Felsic tuff (rhyolite) with 2% py-cpy	Na_2O, CaO	K_2O	Silicification
6	Quartz sericite schist (rhyolite)	Ba, Al_2O_3	Na_2O	Sericite
7	Felsic tuff (dacite) with 1-2% py	Nil	CaO, Na_2O, K_2O	Nil
8	Quartz sericite schist (rhyolite)	Ba	Na_2O	Sericite
9	Quartz sericite schist (dacite) with 2-3% py-cpy	Fe_2O_3	CaO, SiO_2, MgO	Sericite
10	Quartz sericite schist (rhyolite) with 2-3% py-cpy	MgO, CaO	Na_2O	Sericite
11	Quartz sericite schist (rhyolite)	Nil	Na_2O	Sericite
12	Quartz sericite schist (dacite) with 3-5% sph-py	Nil	Na_2O, K_2O	Sericite
13	Quartz sericite schist (rhyolite) with 2-3% sph-py	Al_2O_3, MgO	Na_2O	Sericite
14	Quartz sericite schist (dacite) with 1-2% py	Ba, Al_2O_3, K_2O	SiO_2, CaO, K_2O	Sericite
15	Felsic tuff (dacite) with sericite-chlorite-epidote	Ba	SiO_2, Na_2O	Sericite, chlorite, epidote
16	Felsic tuff (dacite) with 2-3% py	Fe_2O_3, MgO	CaO, Na_2O	Nil
17	Metasediment (greywacke) with sericite alteration	Nil	Nil	Sericite
18	Metasediment (greywacke) with sericite alteration	Nil	Nil	Sericite
19	Chert or felsic tuff (dacite) with 3-5% py	Ba, MgO	CaO, Ka_2O	Nil
20	Felsic tuff (dacite) with sericite-biotite-epidote	Nil	Na_2O	Sericite, biotite, epidote
21	Felsic flow (rhyolite) with trace py	Al_2O_3, CaO, Na_2O	K_2O	Nil
22	Chert with 15 % magnetite-chlorite and 1-2% py-sph	Nil	Nil	Magnetite, chlorite
23	Gabbro (diabase) with 1% py	Fe_2O_3	Nil	Saussarization

Table 21. Alteration Index, Metal Index and Ore Score of the alteration samples from Plomp Farm property.

Sample	Hashimoto	Sericitte	Chlorite	Alteration Index	Cu	Zn	Ag	Spitz	Metal Index	Ore Score
745468	69	78	55	2	1	0	0	34	2	4
745469	74	64	56	1	0	1	0	8	1	2
745470	74	76	30	2	0	1	0	13	1	3
745471	92	35	87	5	0	0	0	20	0	5
745472	91	30	86	5	0	1	0	20	1	6
745473	74	49	60	1	0	1	0	6	1	2
1	75	65	51	1	0	0	2	10	2	3
2	84	84	49	4	1	1	3	20	5	9
3	80	71	58	3	1	1	3	12	5	8
4	92	20	85	5	0	0	2	6	2	7
5	35	26	16	0	0	0	2	4	2	2
6	85	82	54	4	1	1	3	21	5	9
7	83	69	66	3	0	0	2	13	2	5
8	94	94	76	7	1	0	3	52	6	13
9	88	80	76	5	2	1	3	19	6	11
10	54	58	31	0	2	0	2	8	4	4
11	83	81	50	4	1	0	2	19	3	7
12	72	75	53	2	1	2	2	14	5	7
13	60	60	32	0	1	0	2	10	3	3
14	86	82	61	4	1	3	3	18	7	11
15	66	92	49	3	1	2	3	33	7	10
16	92	91	82	8	1	1	2	39	5	13
17	79	70	63	2	1	1	2	13	4	6
18	85	73	69	4	0	0	2	13	2	6
19	79	62	67	1	1	0	2	11	3	4
20	54	65	31	0	0	1	2	10	3	3
21	29	21	15	0	0	0	2	4	2	2
22	84	32	74	3	0	0	2	6	2	5
23	65	39	51	0	0	1	2	5	3	3

Samples with alteration index (>3) and metal index (>3) are discussed below. Some samples also have elevated Ba (>2000 ppm) values. Elevated Ba values commonly occur proximal to VMS vents due to the precipitation of barium sulphate upon cooling of hot vent brines in ambient seawater. These altered felsic volcanic rocks have potential to host VMS deposits, due to the presence of intense alteration and high Ba values indicative of a VMS environment.

Samples 745471 and PF004 are examples of massive chert with 35 to 50 % magnetite-chlorite alteration. Geochemically they comprise 50 to 60% SiO_2 as chert, 25 to 40% Fe_2O_3 as magnetite and the remaining 10 to 15% Al_2O_3-MgO-CaO-SiO_2 as chlorite. These samples have moderate alteration indices of 5 and a low metal index under 2. They rate a low potential to host VMS deposits; however, they are indicative of an exhalitive horizon possibly capping a VMS lens.

Samples 745472 and PF015 are examples of felsic tuff (dacite) with garnet-anthophyllite-biotite or sericite-chlorite-epidote alteration. Geochemically they demonstrate the depletion or replacement of Al_2O_3-CaO-Na_2O-K_2O with a concomitant 24% enrichment by Fe_2O_3. These samples have low to moderate alteration indices of 3 to 5, low to high metal indices of 2 to 7, and low to moderate ore scores of 6 to 10, showing that the altered felsic tuffs have low to moderate potential to host VMS deposits; however, they are not atypical of weak proximal alteration adjacent to a VMS lens.

Samples PF002, PF003, PF006, PF008, PF009, PF010, PF011 and PF014 are examples of quartz sericite schist (rhyolite to dacite) with 1 to 3% pyrite ± chalcopyrite-sphalerite. Geochemically most of these samples have undergone $Na_2O \pm CaO\text{-}K_2O\text{-}SiO_2$ depletion shown mineralogically by intense sericitization of the feldspar. These samples have low to strong alteration indices of 3 to 7, low to strong metal indices of 3 to 7 and ore scores of 4 to 13. They are intensely altered felsic tuffs with low to high potential to host VMS mineralization. Sample PF009 assaying 0.42% Cu, is consistent with representing a stringer/feeder zone or the lower portion of a lens. Sample PF0014 assayed 0.1% Cu and 0.79% Zn and is typical of distal mineralization in the upper or flanking portion of a lens.

Samples PF017 and PF018 are felsic metasediments (greywacke) with weak to moderate sericite alteration. They have a low to moderate alteration index (2 to 4), a low to moderate metal score (2 to 4) and low ore scores of 6. They may represent sediments deposited during a period of quiescence, ultimately burying evidence of VMS activity. Low-grade, conformable to semiconformable alteration of the sedimentary cover is controlled by primary porosity of the unit.

A new airborne geophysical survey was released in December of 2001 on the Stormy Lake area under Operation Treasure Hunt by the Ontario Ministry of Northern Development and Mines (Ontario Geological Survey 2001). This survey consisted of a Time Domain Electromagnetic Survey (Geotem III and Megatem) and Magnetometer Survey based on 200 m flight lines with 50 m readings. Flight direction was dependent upon the orientation of the stratigraphy. A series of 25 maps at 1:20 000 scale were produced. The Ardis Lake area was included in this survey (Map 82 154). Ten electromagnetic anomalies were located during the survey. Figure 13 illustrates the location of these anomalies.

Preliminary examination of the Plomp Farm property indicates that favorable conditions exist for the presence of VMS mineralization.

The stratigraphy of the property has been interpreted from the drilling done by Champion Bear Resources Ltd. It consists of a series of southerly, subvertical to vertically dipping, felsic volcanic rocks, iron formations and metasediments that have been intruded by mafic to felsic dike rocks.

The stratigraphic sequence shows the lowest unit to be weakly altered, felsic volcanic rocks (unit 1). They are overlain by intensely altered felsic volcanic rocks, the quartz sericite schist (unit 2), with weak py +/- sph-cpy stringer mineralization. The quartz sericite schists are overlain, or possibly intercalated with an altered chert with magnetite-chlorite mineralization (unit 3). This exhalitive chert is overlain by an iron formation type chert with minor pyrite (unit 4). This chert of sedimentary origin occurs at the base of a sequence of weakly altered metasediments, mostly greywacke at this location, being the base of the Warclub Group (unit 5). This "alteration" consists of sericite, andalusite, cordierite or sillimanite and is probably related to the regional metamorphic event of the intrusion of the Ghost Lake Pluton (Blackburn and Hinz 1995). A gabbro (unit 6) or possible diabase dike intrudes these metasediments to the northeast. A granite (unit 7), possibly related to the Ghost Lake Pluton, intrudes units 1 to 5 but has not been observed cutting unit 6. A series of feldspar and quartz-feldspar porphyry dikes (unit 8) then intrudes units 1 to 5, and 7, and may be the intrusive equivalent of unit 7. Finally, a pegmatite dike (unit 9) intrudes units 2 and 7, and may also be related to unit 7.

All previous drilling focused on gold-associated quartz veins within quartz sericite schists. Two highly anomalous gold assays, 1.72 opt and 2.98 opt Au (samples PF015 and PF009) were found in this study. They are hosted within sericite-altered felsic tuffs of dacitic composition with $CaO\text{-}SiO_2$ depletion and elevated Zn (0.19%) or Cu (0.42%) values. There was no quartz veining in either sample and they thus represent a new target for gold mineralization. It should be noted that a complete 1m sample was not available for either analysis due to previous testing by Champion Bear Resources Ltd.

The Plomp Farm has favorable potential to host volcanogenic massive sulphide mineralization due to the presence of the following factors:

- the presence of sulphide stringers of pyrite ± sphalerite-chalcopyrite, that may be indicative of a VMS-type environment.
- elevated and anomalous Ba values (>1.0%) usually due to the proximal presence of a hydrothermal vent.
- intense sericite ± garnet, chlorite, anthophyllite associated with hydrothermal alteration of a felsic rock unit
- the presence of an altered exhalitive horizon, i.e. the magnetite-chlorite bearing chert.

Further exploration of the Plomp Farm Property for VMS-type mineralization is strongly recommended.

The following work should be considered high priority:

1) An intensive sampling program of the drill core located on the property. This preliminary investigation has shown that alteration and anomalous base metals values can be found in the core. The core is deteriorating and should be sampled as soon as possible.

2) A ground geophysical survey (HLEM, VLF-EM, and Mag) should be completed over the entire property and along strike for at least 1 km east and west. More VMS-type mineralization may be located at depth and along strike. The IP survey conducted by Champion Bear Resources in 1996 was incomplete and covered the East Plomp property only.

3) A structural analysis should be completed over the property to see if isoclinal folding of the known mineralized units and horizons is present. The Warclub metasediments, with their intercalated felsic volcanic rocks, can be intensely folded (e.g., Thunder Lake gold deposit).

4) If the geophysical and structural data indicate favorable regimes, further drilling would be required to delineate more zones of precious and base metal mineralization. It is not yet known if the gold and base metal units can be correlated or if their mineralization was attributable to the same metallogenic event.

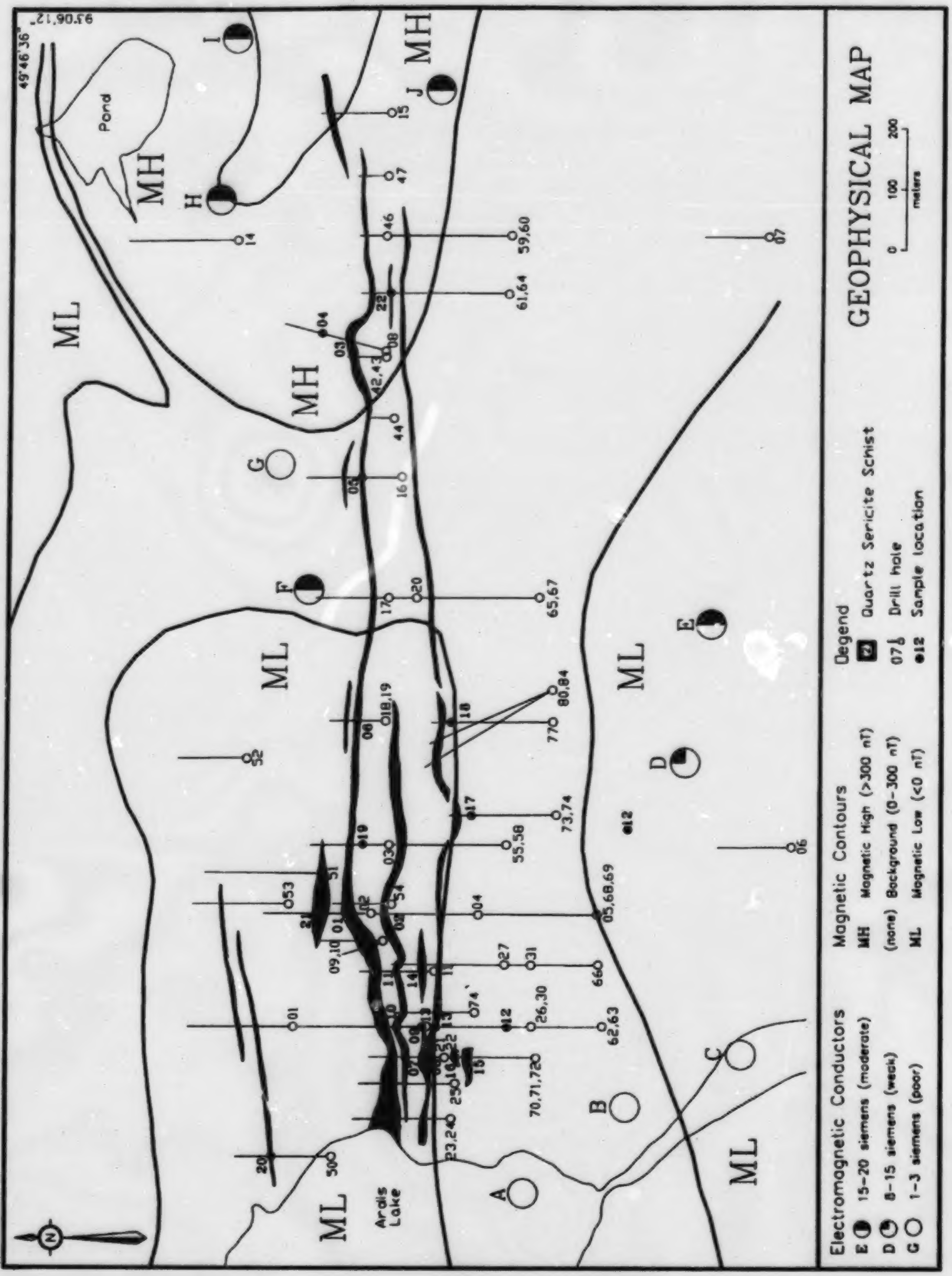

49°46'36"
93°06'12"
N
Pond
Ardis Lake
MH
ML
A
B
C
D
E
F
G
H
I
J
GEOPHYSICAL MAP
0
100
200
meters
Electromagnetic Conductors
E 15–20 siemens (moderate)
D 8–15 siemens (weak)
G 1–3 siemens (poor)
Magnetic Contours
MH Magnetic High (>300 nT)
(none) Background (0–300 nT)
ML Magnetic Low (<0 nT)
Legend
Quartz Sericite Schist
07 Drill hole
12 Sample location

Figure 13. Airborne electromagnetic and magnetic anomalies and drill hole locations on the Plomp Farm property (*modified after* Champion Bear Resources 1996 and Ontario Geological Survey 2001).

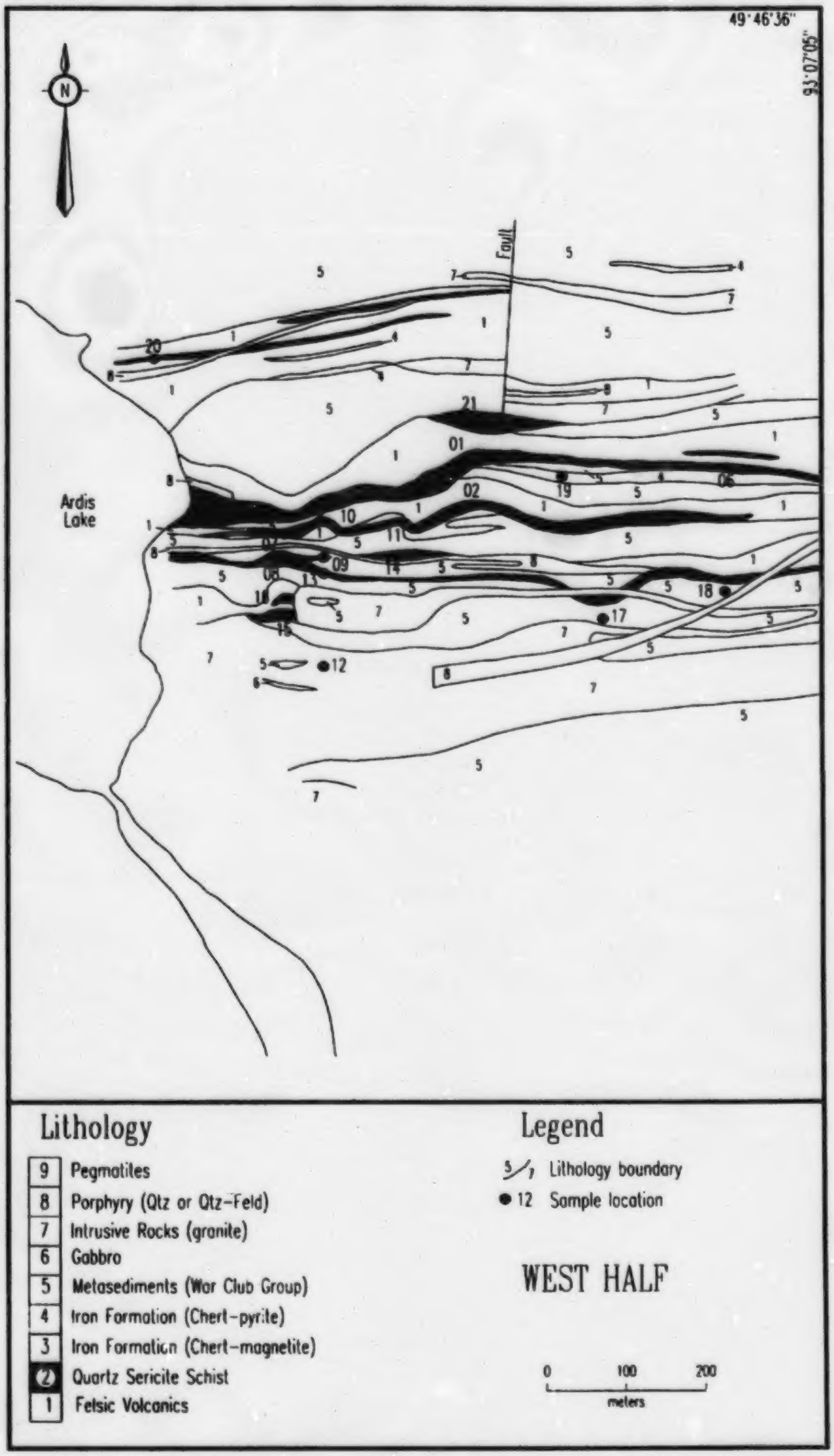
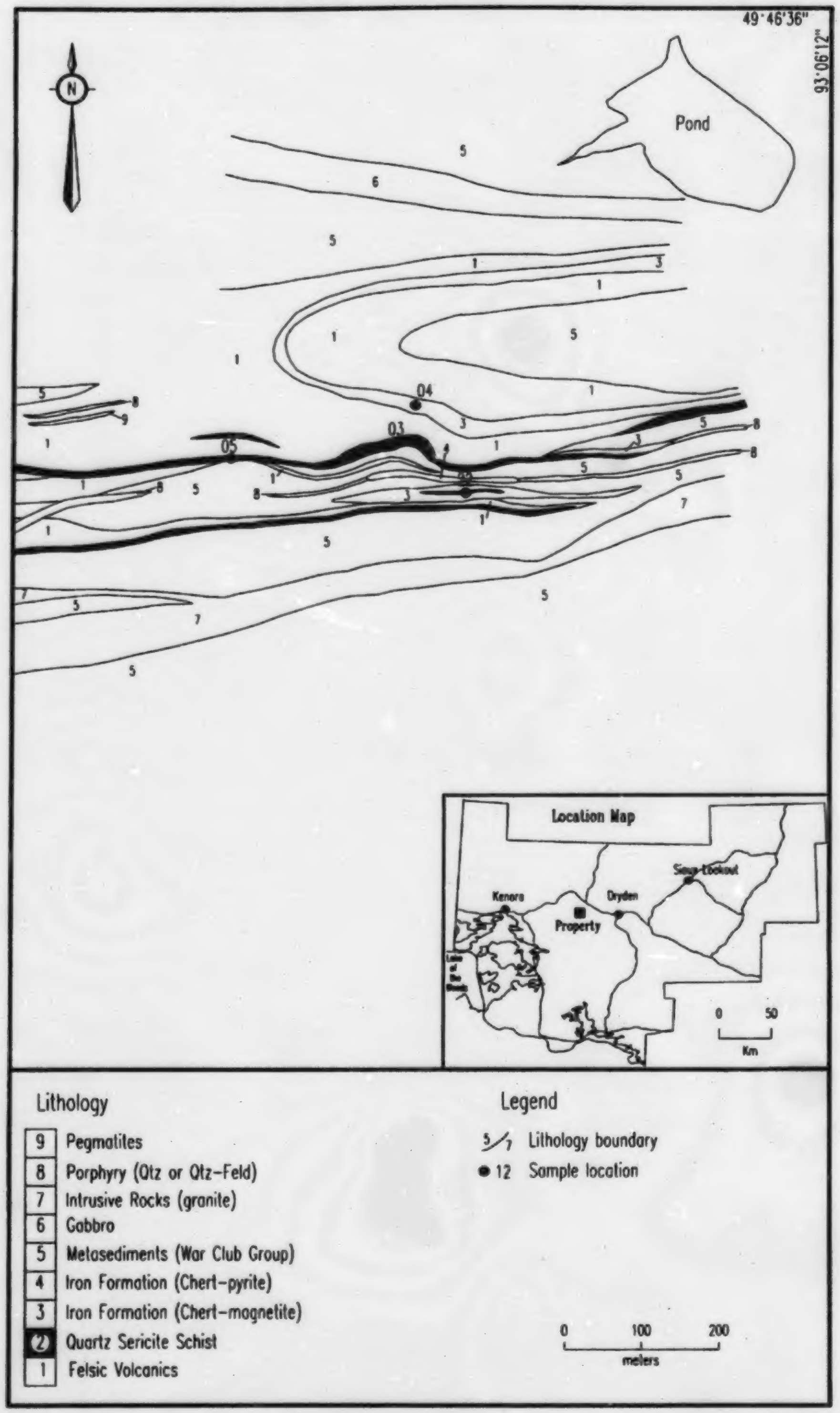

49°46'36"
93°07'05"
N
Fault
Ardis Lake
Lithology
9 Pegmatites
8 Porphyry (Qtz or Qtz-Feld)
7 Intrusive Rocks (granite)
6 Gabbro
5 Metasediments (War Club Group)
4 Iron Formation (Chert-pyrite)
3 Iron Formation (Chert-magnetite)
2 Quartz Sericite Schist
1 Felsic Volcanics
Legend
5/7 Lithology boundary
● 12 Sample location
WEST HALF
0
100
200
meters

Figure 14. Geology and sample locations of the Plomp Farm property west half.


49°46'36"
93°06'12"
N
Pond
5
6
5
1
3
1
1
5
1
1
04
5
8
9
3
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5
8
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02
3
5
7
1
1
5
7
3
7
5
5
Location Map
Sioux Lookout
Kenora
Dryden
Property
0
50
Km
Lithology
9 Pegmatites
8 Porphyry (Qtz or Qtz-Feld)
7 Intrusive Rocks (granite)
6 Gabbro
5 Metasediments (War Club Group)
4 Iron Formation (Chert-pyrite)
3 Iron Formation (Chert-magnetite)
2 Quartz Sericite Schist
1 Felsic Volcanics
Legend
5/7 Lithology boundary
● 12 Sample location
0
100
200
meters

Figure 15. Geology and sample locations of the Plomp Farm property east half.

PORT ARTHUR COPPER PROPERTY (A. RAOUL)

During the fall of 2000, the author conducted a reconnaissance mapping and sampling program of the Port Arthur Copper property located along Highway 11. The highway parallels the mineralized horizon along an east-trending axis. The objective of this program was to evaluate the potential of the area to host volcanogenic massive sulphide (VMS) mineralization through systematic sampling, lithogeochemical analysis and alteration studies.

The property is located 75 km east of Fort Frances, Ontario (52 C/15SE). The occurrence is located on patented mining claim FF4261 (previously HP 187) and is being held by Wilson Plamondon. At the time of publication, the ground to the west and north of this patent was open for staking.

On May 29 of 1916, Arthur E. Stone discovered a sulphide showing on mining claim HP187 (Schnieders and Dutka 1985).

In 1916–17, Port Arthur Copper Mines produced 26, 509 pounds or 1.24 tonnes of copper on the Hewitson and Johnson property (Poulsen 2000).

In 1948, E. Corrigan drilled 5 X-ray holes. No data available (Poulsen 2000).

In 1951, Noranda drilled 6 holes totaling 407 m (Table 22; Kenora Assessment Files 52C/15SE U-1). Three mineralized horizons (A, B and C) were located from this drill data.

In 1955–56, Stratmat performed detailed geological mapping of the area (1:4800), ground electromagnetic and magnetic surveys and completed 35 holes totaling 1515 m (Kenora Assessment Files 52C/15SE K-1). Stratmat identified eight ore zones (A-H) of copper-zinc mineralization hosted within amygdaloidal chlorite schists (Figure 16). These ore zones were located by drilling. Tonnages assigned by this author, based on this drill data, are presented in Table 23.

Table 22. Significant values from Noranda drill program.

Hole	Horizon	Footage (ft)	Interval (ft)	Rock Type	% Cu	% Zn
1	A	170.0-175.4	5.4	Qtz-Chl-Schist (Amyg)	-	1.5
1	B	185.9-189.7	3.8	Qtz-Chl-Schist (Amyg)	-	1.4
1	C	202.2-205.0	2.8	Qtz-Chl-Schist (Amyg)	0.3	0.9
2	B	145.8-150.5	4.7	Qtz-Chl-Schist (Amyg)	-	0.9
2	C	166.0-167.0	1.0	Qtz-Chl-Ser-Sch-Amyg	0.6	15.3
3	C	104.0-109.0	5.0	Qtz-Chl-Ser-Sch-Amyg	0.9	1.2
4	A	189.0-199.4	10.4	Qtz-Chl-Ser-Sch-Amyg	0.3	1.0
4	B	223.0-226.0	3.0	Qtz-Chl-Ser-Sch-Amyg	-	1.6
4	C	243.7-245.6	1.9	Qtz-Chl-Ser-Sch-Amyg	3.6	2.4
5	B	255.0-259.0	4.0	Qtz-Chl-Ser-Sch-Amyg	1.4	0.1
6	A	47.7-49.0	1.3	Qtz-Chl-Ser-Sch-Amyg	0.1	1.2

Table 23. Tonnage calculation on Port Arthur copper property (*after* Stratmat, Kenora Assessment Files 52C/15SE K-1).

Ore Zone	Drill holes used for tonnge calculations	Length (m)	Width (m)	Vertical depth (m)	Average % Cu	Average % Zn	Estimated Tonnage
1	XR36, XR37, XR38, XR39	30.5	3.0	25.0	1.03	1.83	7,320
2	E7, XR34, R38, XR39, XR45	44.0	1.4	6.0	0.62	1.20	1,183
3	E7, XR34, R35, XR45	45.0	1.8	10.4	0.46	0.26	2,696
4	E7, XR34, R35, XR38, XR39, XR45, XR46	77.0	3.5	15.1	0.83	0.30	13,022
5	E6, XR48, R50	27.0	1.2	11.1	0.75	-	1,151
6	E6, E11, XR35, XR46, XR48, XR50, XR51, XR52	89.0	3.6	19.3	1.79	-	19,788
7	XR54, XR55, XR56	46.0	1.0	19.3	0.34	0.44	2,841
8	XR57	15.1	1.0	18.5	-	0.65	894
					1.18**	**0.43*****	**48,895***

SG (specific gravity) = 3.2 (20% sulphides in chlorite schist)
Estimated tonnage = m3 x SG
* Total estimated tonnage
** Averaged weight percent Cu
*** Averaged weight percent Zn

In 1963, Satellite Mines drilled 3 holes (289 m) to the west of, and along strike to, the Port Arthur Copper property. The drill holes did intersect quartz veins hosted within andesitic and dacitic volcanic rocks. No significant gold assays (>0.01 oz/t) were obtained and no copper-zinc assays were recorded (Kenora Assessment Files 52C/15SE J-1).

In 1983, Homestake Explorations performed geological mapping, a geochemical survey and a ground EM-Mag survey focused on the Olive property to the west; however, some work was also performed on the Port Arthur Copper property (Kenora Assessment Files 52C/15SE BB-1).

A) Mapping (1:4800) showed that fine mafic volcanic rocks (unit 1b) were overlain by carbonized, weakly sheared intermediate volcanic rocks (unit 2b). This unit 2b hosts a pyritic zone (23 m wide by 275m long) with best assays of 1.5% Cu over 3.6m. This is overlain by a foliated hertytuff (unit 4c) within a larger unit of felsic tuffs (unit 4a).

B) No geochemical anomalies were located.

C) A magnetic high was located at the Port Arthur Copper property. The anomaly did not continue 100m to the east and no testing was done to the west. A VLF-EM conductor (Fraser Filter) was located at Port Arthur Copper. It did continue for 100m to the east and 100 m to the west.

In 1984, K.H. Poulsen mapped the area for partial fulfillment of a Doctorate of Philosophy for Queen's University. Poulsen stated:

> At the Port Arthur Copper Mine, the stratigraphic setting of the mineralization is virtually identical to that of the Wind Bay. At the Wind Bay property, a typical drill section through 50m of tuffaceous chlorite schist indicated two mineralized zones, 7m and 8.6m in true width, which average 1.5% Zn and 0.2% Cu and 1.1% Zn and 0.09% Cu respectively. The mineralization is underlain to the south by rhyolite lapillistone and tuff, which near the mutual contact, contains alteration consisting of abundant pyrite and pyrrhotite blebs with minor chalcopyrite. The chlorite schists are overlain by relatively unaltered quartz-eye rhyolite tuffs.

In 1984, K.H. Poulsen produced Open File Report 5512 on "The Geological Setting of Mineralization in the Mine Centre–Fort Frances Area, District of Rainy River" (*see* Figure 16). Poulsen stated:

> Low-grade copper and zinc mineralization has been outline by diamond drilling and surface development. The mineralization is stratabound and forms a 1000-ft (330m) long zone at the interface between mafic volcaniclastics and overlying felsic tuffs. Seams and veinlets of sphalerite, chalcopyrite and pyrite occur in en echelon lenticular mineralized zones. These zones appear to follow fragmental horizons within the volcanic sequence and are separated by non-mineralized amygdaloidal flows. These sulfides are crudely zoned into discrete chalcopyrite-rich and sphalerite-rich areas....

In 2000, K.H. Poulsen concluded:

> The rocks of Mine Centre-Fort Frances area occur within the Superior Province in a fault-bounded wedge between two subprovinces, the Wabigoon granite-greenstone terrane to the north and the Quetico metasedimentary-gneiss terrane to the south. The geology of the area is underlain by a dominantly mafic volcanic suite of rocks with minor felsic volcanic rocks and related metasedimentary rocks of the Rainy River Mafic Volcanic Group. Several anorthositic to gabbroic sills, such as the Bad Vermillion and Grassy Portage Sills, intrude this mafic suite. Both the mafic suite and gabbroic sills were then intruded by late granitoid intrusions, such as the Rice Bay and Ottertail Lake intrusions. This entire lithological package is been structurally controlled by the Seine River fault and Quetico fault (Harris, 1974).

In 2000, this author examined the property for alteration and mineralization associated with VMS deposition. The following units were located from south to north:

Unit 1 : Chlorite Schist
A 15 to 16 m wide zone of fine-grained, dark green, chloritic (>30%) rock with small stringers of pyrite-chalcopyrite (3%) and small silicified pods. The unit is probably an altered basalt. Sample 760 is representative of this zone with elevated Cu (745 ppm) and Zn (387 ppm). This was identified by Stratmat as the amydaloidal chlorite schist (unit 4).

Samples 761 and 762 are from the dump pile located 20 m east of the shaft. They are typical of small pods of semi-massive sulphide and iron carbonate (siderite) hosted within this unit. Sample 761 has 20 to 25% pyrite, 3 to 5% chalcopyrite and small quartz pods in the chlorite schist with anomalous Cu (4861ppm) and elevated Zn (386 ppm). Sample 762 has 25 to 30% siderite, 3 to 5% chalcopyrite and 2 to 3% pyrite in the chlorite schist with highly anomalous Cu (6.76%) and Zn (>0.40%). No average grade was obtained by this author.

Unit 2 : Quartz-bearing Chlorite Schist
A 14 to 15 m wide zone of fine-grained, dark green, chlorite schist with 10 to 15% medium-grained quartz amygdules or possible quartz eyes. The quartz eyes are common within the first 3 to 4 m but decrease in size and quantity to the north; this may represent grain size reduction. Sample 763 is representative of this zone with anomalous Cu (4004 ppm) and elevated Zn (342 ppm). This horizon contains stringer zones of 4 to 6% pyrite-chalcopyrite, similar to unit 1, and is represented by sample 764 with anomalous Cu (8701 ppm) and Zn (1547 ppm). This was identified by Stratmat as the amydaloidal chlorite schist (unit 4). No average grade was obtained by this author.

Unit 3 : Felsic to Intermediate Tuff
A wide zone (>100 m) of fine-grained, light grey, felsic to intermediate tuff with weak to moderate sericite alteration and a foliation of 078°/82°NW. Samples 745765 and 745766 are representative of this zone with background Cu (6 to 160 ppm) and Zn (105 to 158 ppm). This was identified by Stratmat as the quartz porphyry intrusive (unit 7).

Unit 4 : Mafic Dike
A 0.30 m wide mafic dike cuts across this felsic to intermediate tuff at 15 to 20° to the foliation. This is found 75 to 80 m north of the shaft. It was not sampled due to the flatness of the outcrop.

Values in Table 26 were used to calculate the Ore Score. The Ore Score is a quantitative rating system of comparing alteration and mineralization (Table 24; Raoul and Masson 1998). The higher the Ore Score value the greater the indication of hydrothermal alteration and presence of base metal mineralization. Formulas shown in Table 25 were used to determine the Ore Score of selected alteration samples. The calculated values are presented in Table 26.

Table 24. Ore score, alteration index, metal index and VMS mineralization potential ratings.

Ore Score Alteration Index + Metal Index	**Alteration Index (0-9) Hashimoto Index + Sericite Index + Chlorite Index**	**Metal Index (0-11) (Cu + Zn + Ag mineralization) + Spitz Index**	**VMS Mineralization Potential**
0-3	Low	Low	Nil
4-6	Moderate	Moderate	Low
7-9	High	High	Low-moderate
10-12	-	Very high	Moderate
13-15	-	-	Moderate-high
16-18	-	-	High
19-20	-	-	Very high

Table 25. Index, index formulas and metal score values.

Index	**Index Formula**	**Score 1**	**Score 2**	**Score3**
Hashimoto Index	$(MgO+K_2O) / (MgO+K_2O+ Na_2O+CaO)100$	>70	>80	>90
Sericite Index	$(K_2O) / (Na_2O+K_2O)100$	>70	>80	>90
Chlorite Index	$(MgO+F_2O_3) / (MgO+Fe_2O_3+2CaO+2Na_2O)100$	>70	>80	>90
Spitz Index	Al_2O_3 / Na_2O	>25	>50	-
Cu and Zn		>100 ppm	>1000 ppm	>5000 ppm
Ag		> 1 ppm	>2 ppm	>5 ppm

Table 26. Major element geochemistry and Cu, Zn, Ag assays from the Port Authur copper property.

Sample	**SiO_2 %**	**Al_2O_3 %**	**Fe_2O_3 %**	**MgO %**	**CaO %**	**Na_2O %**	**K_2O %**	**MnO %**	**P_2O_5 %**	**TiO_2 %**	**LOI %**	**Cu ppm**	**Zn ppm**	**Ag ppm**
760	29.25	19.29	34.00	8.89	0.58	0.01	0.02	0.10	0.44	2.02	7.66	745	387	3
761	19.05	18.58	38.54	8.41	0.45	0.01	0.25	0.09	0.33	1.86	8.70	4861	386	12
762	18.62	7.41	26.55	7.44	11.20	0.10	0.93	0.43	0.69	0.55	9.94	67574	>4000	14
763	59.89	10.58	18.14	4.88	0.49	0.01	0.02	0.10	0.32	1.05	4.76	4004	342	2
764	45.13	10.34	28.36	4.73	0.42	0.01	0.01	0.34	0.28	0.97	8.86	8701	1547	15
765	67.20	11.92	11.05	1.51	0.47	2.30	1.36	0.15	0.14	0.73	3.52	160	158	2
766	72.00	11.44	6.08	0.47	0.93	3.45	1.70	0.12	0.08	0.51	3.41	6	105	1

Table 27. Alteration Index, Metal Score and Ore Score of alteration samples from Port Arthur copper property.

Sample	**Rock Type**	**Hashimoto**	**Sericite**	**Chlorite**	**Alteration Index**	**Cu**	**Zn**	**Ag**	**Spitz**	**Metal Score**	**Ore Score**
760	3 % Py-Cpy in Chlorite Schist (BST)	94	67	97	6	1	1	2	1929	6	12
761	20-25% Py and 3-5% Cpy in Chlorite Schist	95	96	98	9	2	1	3	1858	8	17
762	>25% Siderite, 3-5% Cpy and 2-3% Py in Chlorite Schist (BST)	43	90	60	3	3	3	3	74	11	14
763	Chlorite Schist with 10-15% Quartz Amygdules	91	67	96	6	2	1	2	1058	8	14
764	Chlorite Schist with 4-6% py-cpy stringers	92	50	97	6	3	2	3	1034	10	16
765	Andesite Tuff	51	37	69	0	1	1	2	5	4	4
766	Andesite Tuff	33	33	43	0	0	1	1	3	2	2

Samples with significant alteration are discussed in detail below.

Sample 760 is a fine-grained, dark green, foliated, chloritized basalt. The high TiO_2 (2.02%) and MgO (8.89%) values are indicative of a ferrobasalt with moderate to strong chlorite alteration. Low SiO_2 (29.25%), Na_2O (0.01%) and K_2O (0.02%) values show replacement of the silica, sodium and potassium by over 43% Fe_2O_3-LOI; typically under 10% combined. This sample shows a moderate alteration index of 6, a moderate metal score of 6 and a moderate ore score of 12. This is typical of the periphery of altered stockwork zones with weak mineralization.

Sample 761 is a fine-grained, dark green, foliated, chloritized basalt; similar to sample 760. The high TiO_2 (1.86%) and MgO (8.41%) values are indicative of a ferrobasalt with moderate to strong chlorite alteration. Low SiO_2 (19.05%), Na_2O (0.01%) and K_2O (0.25%) values show replacement of the silica, sodium and potassium by over 47% Fe_2O_3-LOI. This sample shows a strong alteration index of 9, a high metal score of 8 and a high ore score of 17. This is typical of the highly altered stockwork zones with moderate mineralization (0.48% Cu).

Sample 762 is a fine-grained, dark green, foliated, chloritized basalt. The moderate TiO_2 (0.55%) and high MgO (8.41%) values are indicative of a dacite to andesite with moderate to strong chlorite alteration. Low SiO_2 (18.62%) and Na_2O (0.10%) values show replacement of the silica and sodium by over 36% Fe_2O_3-LOI. This sample shows a low alteration index of 3, a very high metal score of 11 and a moderate to high ore score of 14. This is typical of altered stockwork zones with strong mineralization (6.75 % Cu and >0.4 % Zn).

Sample 763 is a fine-grained, dark green, foliated, chloritized basalt with 10 to 15% quartz amygdules. The moderate to high TiO_2 (1.05%) and moderate SiO_2 (59.89%) values are indicative of an andesite to andesitic basalt. Low CaO (0.49%), Na_2O (0.01%) and K_2O (0.02%) values show strong depletion of the calcium, sodium and potassium. This sample shows a moderate alteration index of 6, a high metal score of 8 and a moderate to high ore score of 14. This is typical of moderately altered stockwork zones with moderate mineralization (0.40 % Cu).

Sample 764 is a fine-grained, dark green, foliated, chloritized basalt with 3 to 5% quartz amygdules; it is similar to sample 763. The moderate to high TiO_2 (0.97%) is indicative of an andesitic basalt to andesite. Low SiO_2 (45.13%), CaO (0.42%), Na_2O (0.01%) and K_2O (0.01%) values show replacement of the silica, calcium, sodium and potassium by over 37% Fe_2O_3-LOI. This sample shows a moderate alteration index of 6, a very high metal score of 10 and a high ore score of 16. This is typical of moderately altered stockwork zones with moderate mineralization (0.87% Cu and 0.15% Zn).

Samples 765 and 766 are fine-grained, light grey, weakly foliated, dacite to andesite tuffs (SiO_2 67 to 72% and TiO_2 0.51 to 0.73%) with weak sericite alteration (K_2O 1.36 to 1.70%). These samples show no alteration, weak mineralization, and low to nil ore scores.

Further exploration of the Port Arthur Copper property is recommended. Moderate to strong hydrothermal alteration associated with VMS deposition environments was recognized by this author, and 8, small copper-zinc-bearing sulphide ore zones were delineated by Stratmat.

The following recommendations should be considered:

1) A ground geophysical survey (HLEM, VLF-EM, and Mag) should be completed over the entire property and along strike for at least 1 km east and west of the deposit area. More of these mineralized pods could exist at depth and along strike. Previous geophysical surveys, Homestake (1983) and Stratmat (1955), were incomplete and would not have the depth penetration of modern surveys.

2) A structural analysis should be completed over the property to see if isoclinal folding of the mineralized units and horizons is possible. The entire Quetico–Seine River Fault Wedge has undergone one type of structural strain or another; a simple north-south compressive buckling of the previously, highly foliated units (chlorite schists) could be possible and thus cause a repetition of this mineralization.

3) If the geophysical and structural data indicate favorable regimes, deep drilling is recommended of the mineralized zones. All previous drilling was carried out at less than 100 m vertically below the surface. Thicker mineralization or higher grades may exist at depth due to the folding nature of the pliable chlorite schists and the sulphide bodies.

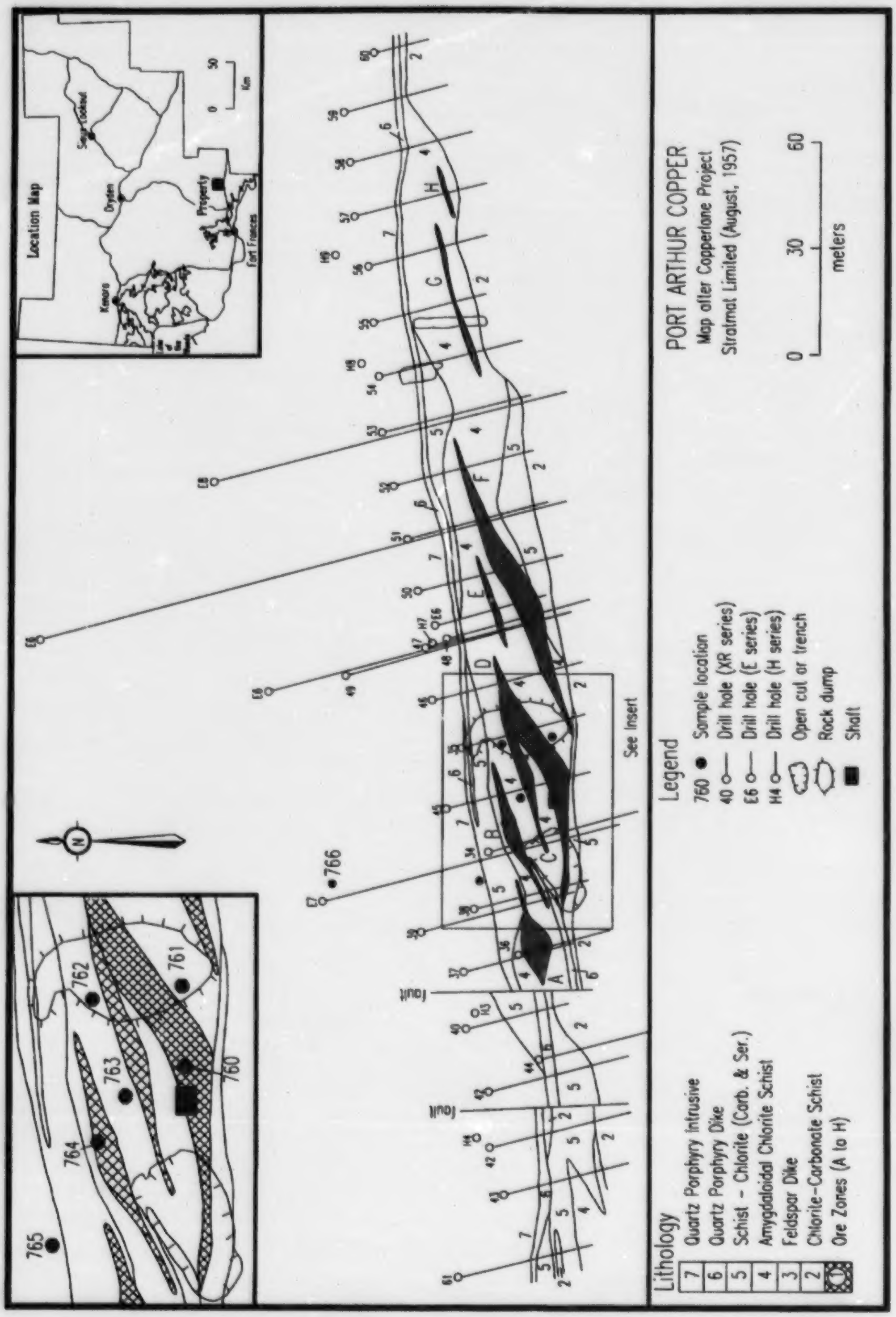
PORT ARTHUR COPPER
Map after Copperlone Project
Stratmat Limited (August, 1957)
0
30
60
meters
Location Map
Kenora
Dryden
Sioux Lookout
Property
Fort Frances
0
50
Km
Legend
760 ● Sample location
40 ○— Drill hole (XR series)
E6 ○— Drill hole (E series)
H4 ○— Drill hole (H series)
Open cut or trench
Rock dump
■ Shaft
Lithology
7 Quartz Porphyry Intrusive
6 Quartz Porphyry Dike
5 Schist - Chlorite (Carb. & Ser.)
4 Amygdaloidal Chlorite Schist
3 Feldspar Dike
2 Chlorite-Carbonate Schist
Ore Zones (A to H)
See Insert
fault
fault
A
B
C
D
E
F
G
H
•766
765
764
763
762
761
760
N

Figure 16. Geology, sample, diamond drill hole and trench locations for the Port Arthur copper property.

RECOMMENDATIONS FOR EXPLORATION

Potential for VMS-Style Mineralization in the Warclub Assemblage

The Warclub assemblage is a laterally extensive package of metasedimentary and metavolcanic rocks (Blackburn and Hinz 1995) extending roughly 250 km from the southwestern corner of Lake of the Woods to the Minnitaki Lake area, south of Sioux Lookout (Figure 17). The assemblage contains zones of geochemical enrichment and depletion indicative of a hydrothermal environment associated with volcanogenic massive sulphide deposits. In addition, highly anomalous zinc and copper values are documented at various locations within the Warclub assemblage. These factors strongly suggest that the Warclub assemblage should be re-examined for its base metal potential.

Exploration programs in the 1990s focused only on the gold potential of quartz-phyric sericite schist within the Warclub. Significant programs included the Thunder Lake project of Teck Exploration Ltd. and Corona Gold Corporation, operated from 1990 to 1998; and Champion Bear Resources' Plomp Farm property. Readers are referred to the Plomp Farm property write-up in the Property Examinations section of this report.

Work by Champion Bear Resources Limited identified significantly elevated gold and base metal values within a mixed package of metasedimentary and felsic metavolcanic rocks. Diamond drilling intersected a 36 m wide zone of quartz-phyric felsic flows exhibiting moderate to strong sericite, silica, biotite, garnet and anthophylite-grunerite alteration and 1 to 3% pyrite ± chalcopyrite, sphalerite and gold mineralization.

Hole PF70 intersected a 1.5 m wide zone of volcanogenic mineralization returning 7.99% Zn, 25.4 ppm Ag and 5.2 g/t gold, hosted within epidote-amphibole-altered quartz-sericite schist (personal communication, F. Plomp, prospector, 2001).

Further evidence of a volcanogenic massive sulphide environment includes the presence of graphitic metasediments, in the Pope Lake area, containing disseminated pyrite-pyrrhotite yielding elevated copper-zinc (>1100 ppm) values. This unit may represent the end of volcanic activity in the area, which resulted in the development of a sedimentary cap above the volcanic pile. In addition, gold-arsenic mineralization near Aubrey Lake is hosted within pyritic mafic volcanic rocks with chlorite-sericite-iron carbonate alteration. This association, elevated arsenic in highly altered mafic volcanic rocks, has been documented in alteration pipes related to volcanogenic massive sulphide deposits.

In summary, the Warclub assemblage is made up of a mixed package of metasedimentary and felsic metavolcanic rocks. It contains zones of geochemical enrichment and depletion indicative of a hydrothermal environment associated with volcanogenic massive sulphide deposits. In addition, highly anomalous zinc and copper values are documented at various locations within the Warclub assemblage. These factors suggest that the Warclub assemblage should be re-examined for its base metal potential.

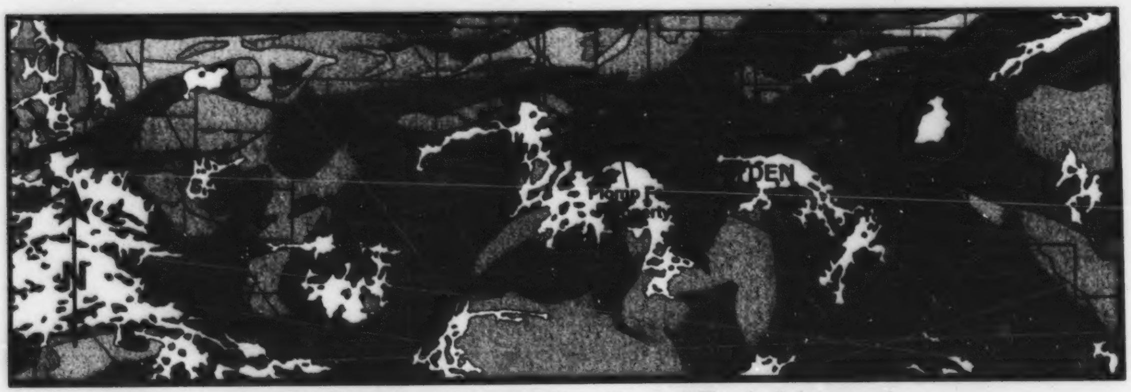

Figure 17. General location of the Warclub group (arrows), Plomp Farm and Thunder Lake properties.

Rare-Element Pegmatite Potential in Brownridge Township

In recent years, exploration for rare-element pegmatites, containing tantalum, petalite, rubidium and cesium, has focused on the Separation Rapids area, north of the Kenora and the Raleigh Lake area, west of Ignace. Companies including Avalon Ventures, Champion Bear Resources Limited, Emerald Fields Resource Corporation, Gossan Resources and the Tantalum Mining Corporation of Canada Limited have conducted extensive exploration programs in these areas. Work by Beakhouse (2001) and Breaks , Selway and Tindle (2001) have re-kindled interest in the rare-element pegmatite potential of the Ghost Lake area, in particular, Brownridge Township. In May 2001 Houston Lake Mining Inc. announced the acquisition of the Ghost Lake Tantalum Property which hosts tantalum values up to 0.019% Ta_2O_5 (press release, Houston Lake Mining Inc., May 2, 2001). Houston Lake Mining is planning a field exploration program for spring of 2002 (personal communication, G. Anthony, Houston Lake Mining Inc., 2002).

Fieldwork conducted by Beakhouse in 2001 identified a number of previously undocumented rare-element pegmatites in central Brownridge Township. Beakhouse states, "Many of these pegmatites are relatively complex with coarsely pegmatitic, aplitic and banded aplitic zones and commonly containing coarse, blocky potassium feldspar, as well as muscovite, tourmaline and garnet. One such pegmatite … was observed to contain large (<5cm) beryl crystals in association with coarse tourmaline and garnet along with minor apatite suggesting that some of these pegmatites may be highly evolved." (Beakhouse 2001). Follow-up work conducted by Breaks, Selway and Tindle (2001) identified several significant geochemical results. The pegmatite containing the beryl crystals "…returned a strongly anomalous lithium concentration of 199 ppm." Sampling of another pegmatite returned assays of 1470 ppm Rb, 220 ppm Nb, 88 ppm Sn and 50 ppm Ta (Breaks, Selway and Tindle 2001). With the continued interest in tantalum and other rare-element commodities such as rubidium and cesium, explorationists are recommended to explore Brownridge Township and surrounding areas for additional occurrences of rare-metal pegmatites. Readers are directed to Open File Report 6070 (*Summary of Field Work and Other Activities, 2001*) and articles therein, authored by Beakhouse (article 15) and Breaks, Selway and Tindle (article 39), for further information.

Volcanogenic Massive Sulphides (Copper, Zinc, Lead, Silver) in the Kenora District

In the Kenora District, volcanogenic massive sulphides (VMS) containing both base and precious metals, are known to occur within felsic to mafic volcanic rocks. Significant production in the Sturgeon Lake area yielded 18.38 million tons of 8.48% Zn, 1.05% Cu and 0.91% Pb.

Older exploration methods (pre-1990) focused on drilling airborne and ground geophysical conductors with limited geological mapping of the properties. Since 1990, VMS exploration has focused on detailed geological mapping and geochemical evaluation for the presence of hydrothermal alteration halos associated with VMS depositional environments. Several areas of known VMS mineralization are being re-evaluated while others remain open for staking, and have yet to be evaluated for hydrothermal alteration signatures.

Table 28 and Figure 18 identify areas in the Kenora District with potential to host VMS-type mineralization. A brief description of the lithology, alteration and mineralization is provided in Table 28. The assay/value column indicates the most significant VMS base metal mineralization associated with the units.

Table 28. VMS potential areas in the Kenora District.

No	AREA	GEOLOGY / MINERALIZATION	RESERVES / ASSAYS
1	Treelined Lake-Helder Lake Area	Sulphide breccia in a recrystallized chert with silica-biotite alteration. This is overlain by altered chert-magnetite iron formation in a sequence of felsic to intermediate pyroclastic rocks ranging from tuffs to tuff breccia in the Helder Lake area. There is sporadic garnet and chlorite alteration in the footwall basalt.	Sulphide breccia of pyrite-pyrrhotite with arsenic-gold-silver mineralization with values of 2.06 g/t gold over 0.15 m and sporadic Cu (0.60%) and Zn (0.77%). Kenora Assessment Files 52L/08SE D-1 to D-5
2	Ewart-Forgie Townships	Weakly sericitic, rhyolite breccia capped by a pyritic chert (siliceous sediment) hosted by mafic volcanic rocks. Anomalous Sn values (>1000 ppm) located in sheared chert horizon.	Only localized base metal showings (Cu or Zn <5000 ppm) have been found in the felsic volcanic rocks and cherty iron formation. Kenora District Geologist Property Examination 2001
3	Code Tp.-Manross Tp	Series of mafic to intermediate volcanic rocks with intercalated felsic crystal tuffs-flows with overlying siliceous sediment (recrystallized chert). The alteration found was chlorite, sericite, silica and carbonate. No VMS alteration studies done.	In 1972-73, drilling by Dome Exploration located 12 areas with elevated Cu, Zn Pb, Au, Ag values in mafic volcanic, felsic volcanic and siliceous sediments. Kenora Assessment Files 52F/09SE A-1 to A-10
4	Kakagi Lake Area	Series of dacite to rhyodacite tuff hosted within andesitic volcanic rocks. Two Cu-Zn-Au-Ag showings with chlorite-garnet alteration, Na-depletion and K-enrichment. Located southwest of the Stephen Lake Stock	Weisner Lake Occurrence: 3 to 6 m mineralized zones of bedded dacite tuff. Best assays 10.8% Zn and 0.21% Cu over 0.91m. Kenora Assessment Files 52F/05SW N-1 to N-2
5	Straw Lake Area	Brecciated rhyolite hosted within andesite and basalt with strong east-west shearing. Sericite, chlorite, silica and carbonate alteration is common with associated pyritization. Located south of a hydrothermally altered granite.	Straw Lake Beach Mine: Au-Ag-Cu mineralization hosted within sheared QFP and altered (sericite-chlorite) felsic volcanic. Associated Pb-Bi-Zn and magnetite mineralization present. Kenora mineral deposit files 52F/3NW
6	Black Hawk-Burditt Lake Area	Rhyodacite to dacite lapilli tuffs and pyroclastic rocks intercalated with epidote-carbonate altered andesite with minor pyrite-magnetite mineralization.	Off Lake: 0.36% Cu over 2 m in disseminated Py-Cpy-Po in rhyolite porphyry. Kenora Mineral Deposit Files 52F/13NW
7	Swell Bay Area	Massive sulphides (Py-Po +/- Sph- Cpy) in sericite and/or chlorite altered felsic tuffs and flows hosted by intermediate to mafic tuffs and flows.	Lochart Lake : 10.76 million t of 0.15% Cu and 0.72% Zn. High grade section of 3.6 million t of 0.35% Cu and 1.43% Zn. Kenora Assessment Files 52C/10NW Y-6
8	Tustin-Bridges Townships	Moderately to highly metamorphosed felsic tuffs and chert with garnet and amphibole (prograde chlorite) alteration. Stringer sulphide mineralization of Py-Po-Sph-Cpy-Gal present.	Cates Occurrence: trench had 11.44% Zn, 0.23% Cu, 6.21% Pb and 2.26 opt Ag (Hinz 1999). These are hosted in quartz-feldspar-biotite gneiss; altered, high-grade felsic volcanic rocks. Kenora Assessment Files 52F/13SE B-1 to B-6

No	AREA	GEOLOGY / MINERALIZATION	RESERVES / ASSAYS
9	Vermilion Bay-Dryden Area	The Warclub is a group of clastic metasediments with minor chemical sediments (iron formation) with rafts of felsic and mafic volcanic rocks. This iron formation extends over 30 km with little exploration except as a source of iron or limited review for gold potential.	Plomp Farm : drilling by Champion Bear Resources intersected 1.5m of 7.99% Zn, 25.4 g/t silver and 5.2 g/t gold in hornblende-epidote altered quartz sericite schist. Kenora Assessment Files 52F/14SE E-4.
10	Stormy Bending lakes Area	The Stormy-Bending Lake area consists of synclinally folded mafic volcanic, felsic volcanic, sulphide and oxide facies iron formation and metasediments with associated chlorite-sericite alteration and 2 copper-zinc showings.	Bending Lake: confirmed hydrothermal alteration of Na-Ca depletion, K-Mg enrichment and stringer Py ± Cpy mineralization in fractured zones of felsic and mafic volcanic rocks. Ravnaas and Raoul (2001)
11	McIlraith Township	The Abram Lake Greenstone belt is underlain by basalt with associated disseminated and massive sulphides and iron formation. This basalt is overlain by rhyolite (breccia) with base-metal massive sulphide horizons and is overlain by disseminated pyrrhotite in a felsic tuff (exhalite). These are truncated and overlain by alluvial sedimentary rocks.	Previous drilling (Selco 1979 and Rio Tinto 1979) have located Py-Po stringer mineralization with 30% galena and 15% sphalerite (over 0.05 m) hosted by sericite-chlorite altered dacite-rhyolite. Massive Py-Po zones (1.5 and 2.1 m) overly intense sericite alteration in a rhyodacite tuff. Kenora Assessment Files 52K/01SW 41
12	Sturgeon Lake Area	A series of chlorite-carbonate altered cherty rhyolite flows with stringer Py-Cu mineralization. Deposition of the massive sulphide lenses of Py-Sph-Cpy mineralization. Overlain by upper rhyolite tuff or andesite flows.	Open areas 3-5 km north and west of the past producing Mattabi Deposit : 12.55 million tons of 8.28 % Zn, 0.74% Cu, 0.85 % Pb, 3.31 oz/t Ag plus Lyon Lake, Creek Zones and Sturgeon Lake. Raoul and Ravnaas (2001)
13	Marchington Road Area	Mineralization (Po-Py-Cpy-Sph) and alteration (chlorite-silica) occurs at the contact of quartz feldspar porphyry in contact with the overlying felsic crystal tuff and pyroclastic units.	Marchington Road Deposit: 216 000 tons of 0.76% Cu, 3.2% Zn and 1.8 ounces per ton silver. Bond (1980)

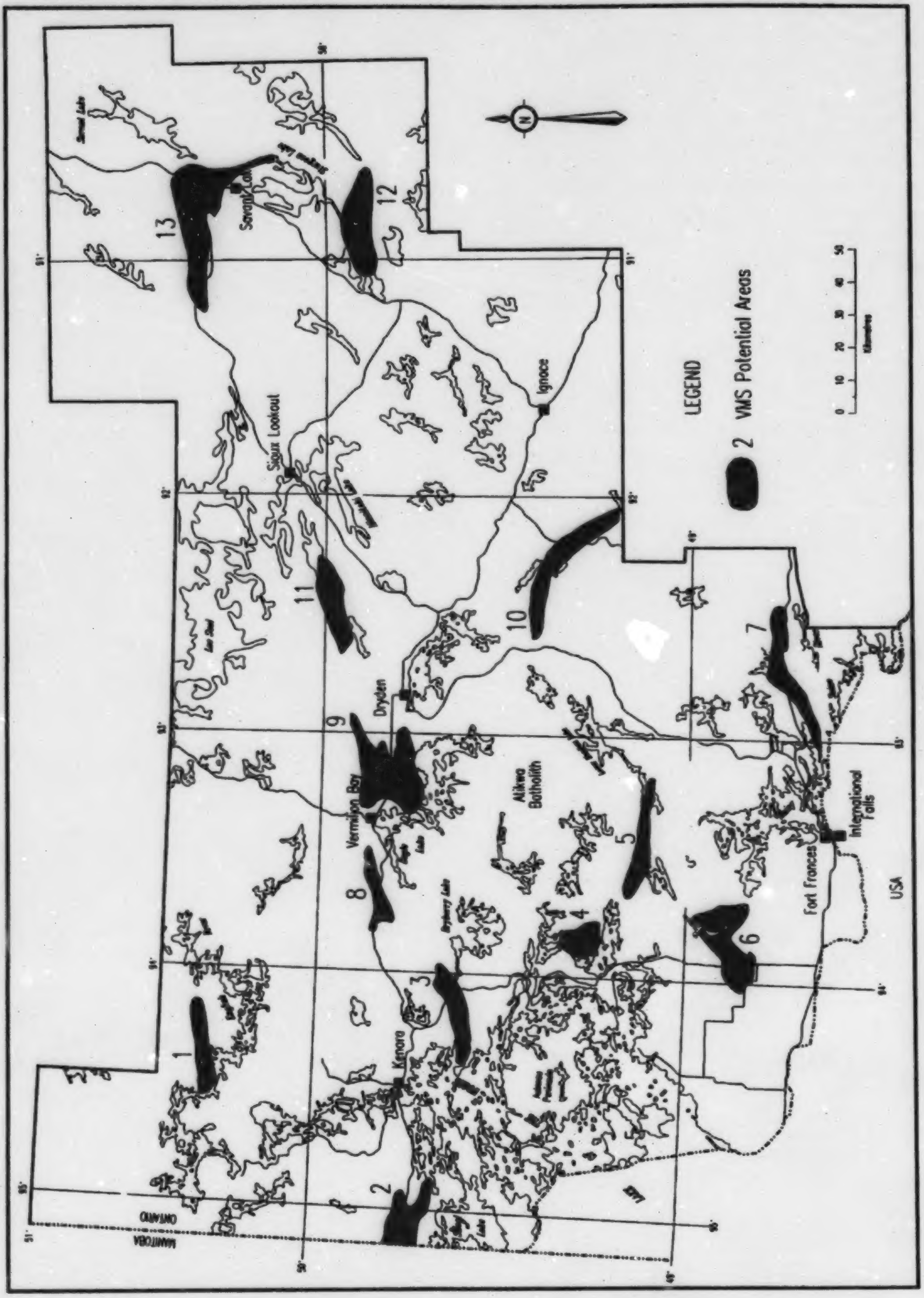
1
2
3
4
5
6
7
8
9
10
11
12
13
Kenora
Dryden
Vermilion Bay
Sioux Lookout
Savant Lake
Ignace
Fort Frances
International Falls
USA
Aliwa Batholith
MANITOBA
ONTARIO
LEGEND
2 VMS Potential Areas
0 10 20 30 40 50
Kilometres
N

Figure 18. VMS potential areas in the Kenora District.

OGS ACTIVITIES AND RESEARCH BY OTHERS

Three Ontario Geological Survey (OGS) field projects, 1 Operation Treasure Hunt (OTH) and 2 OTH purchased proprietary airborne magnetic and electromagnetic surveys, and 2 OTH comparative metallogenic studies were conducted in the Kenora District in 2001. Figure 19 illustrates the location of 7 of these projects.

A) The OTH airborne magnetic and electromagnetic survey for the Stormy Lake area was released in December of 2001. The area was flown using a fixed-wing aircraft mounted with the MEGATEM time-domain airborne electromagnetic, the GEOTEM digital time-domain electromagnetic and total field magnetometer instruments. A total of 33 875 km of flight lines were flown at 200 m spacing intervals. The area covered from Eagle Lake to Ignace using variable flight paths dependant upon geological contacts. Twenty five maps at scale 1:20 000 were released as part of this survey (Maps 82 154 to 82 177).

B) G. Beakhouse, Precambrian Geoscience Section, OGS, completed the second year of a five-year project mapping the Thunder Lake segment of the Wabigoon area.

C) J. Arnold completed a joint OGS–Laurentian University study on the geology and nickel-copper-platinum group element mineralization of the Entwine Lake Intrusion.

D) D. Russell, Sedimentary Geoscience Section, OGS, completed a high-density lake sediment and water geochemistry survey for the Sturgeon Lake–Wabigoon Lake area.

E) OTH purchased proprietary airborne magnetic and electromagnetic survey data (Maps 60 006 to 60 008) for the Docker area. The survey used Aerodat 6 frequency system (EM) and magnetometer instruments.

F) OTH purchased proprietary airborne magnetic and electromagnetic survey data (Maps 60 086 to 60 089) for the Kagaki Lake area. The survey used GEOTEM digital time-domain electromagnetic and total field magnetometer instruments.

G) F.W. Breaks, J.B Selway, Precambrian Geoscience Section, OGS, and A.G. Tingle, The Open University, United Kingdom, completed a study on fertile peraluminous granites and related rare-element pegmatite mineralization, Superior Province, Northwest and Northeast Ontario in 2001.

H) C. Vaillancourt, R.A. Sproule, C.A. MacDonald and L.J. Hulbert completed an OTH study on the potential for Platinum Group Element Mineralization in Mafic-Ultramafic Intrusions in Ontario in 2001.

ACKNOWLEDGEMENTS

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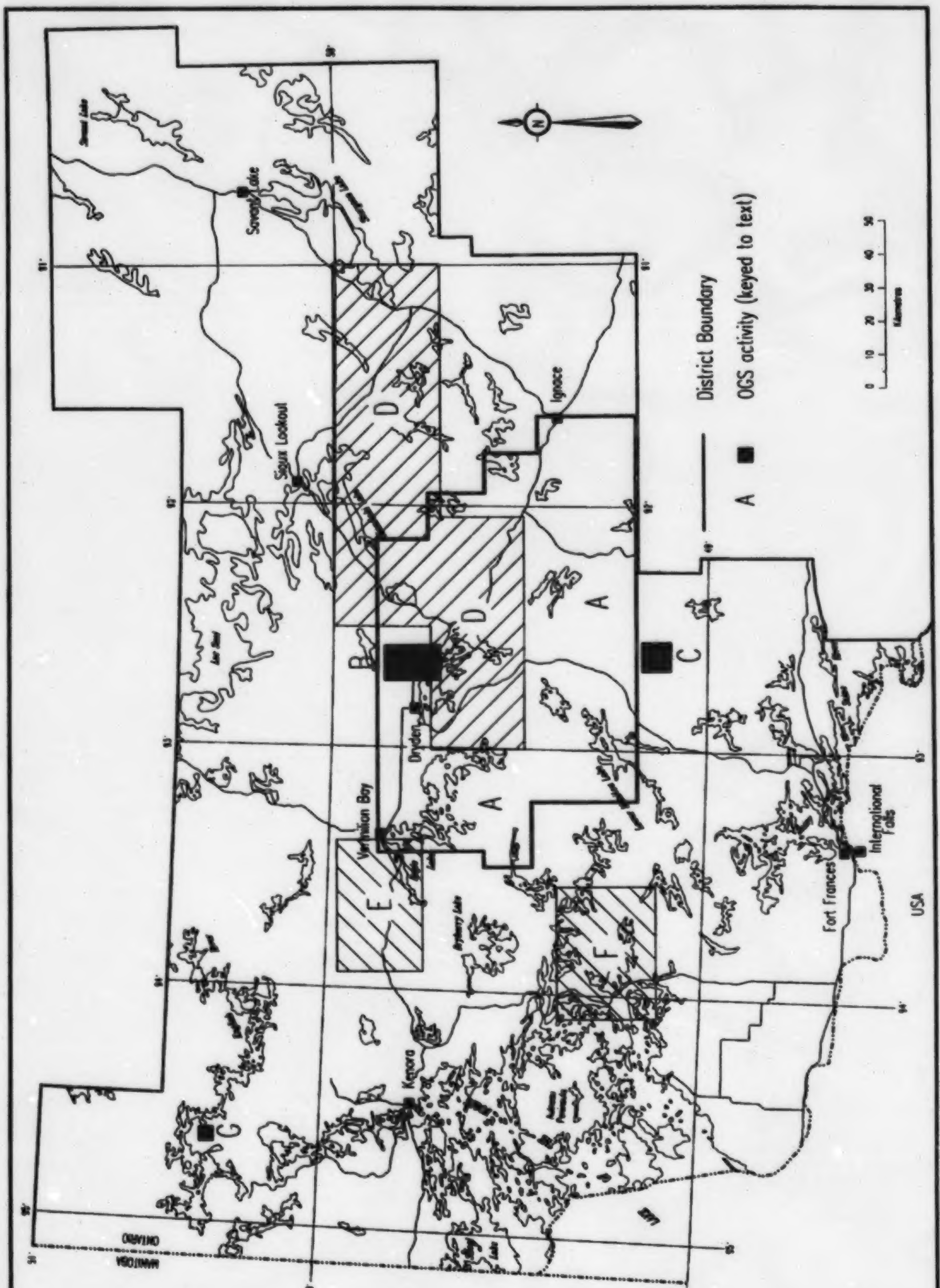
District Boundary
A ■ OGS activity (keyed to text)
0 10 20 30 40 50
Kilometres
N
Savant Lake
Sioux Lookout
Ignace
Dryden
Vermilion Bay
Kenora
Fort Frances
International Falls
USA
MANITOBA
ONTARIO
A
A
A
B
C
C
D
D
E
F

Figure 19. Kenora District OGS field activities, OTH surveys and research by others in 2001. Letters keyed to those in text.

Table 29. Mineral deposits in the Kenora District 2001.

Abbreviations

AF	Assessment Files
CMH	Canadian Mines Handbook
GR	Geological Report
MDC	Mineral Deposit Circular
MDIR	Mineral Deposit Inventory record
ROA	Report of Activities
MLS	Mining Lands, Sudbury
MR	Mining Recorder
NM	The Northern Miner
OFR	Open File Report
PC	Personal Communication

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Apex Occurrence (52F/5NE)	Cu, Ni	Zone : 110m x 4m x 180m Est. Resource : 237,600 t @ 1.03% Cu and 0.56% Ni.	J. Clark	GR 111, p.40	Staked claim K1239515
Avery Township (Melgund Lake) (52F/9NW)	Ballast	Quarry : 160m x 90m x 15m Est. Production : 648,000 t Reserves : open	CPR	OFR 5680, p.9 MDC 27, p.11	Inactive quarry, Under W.L.L. C-2311
Bad Vermilion Lake-Seine Bay Prospect (52C/10NE)	Fe, Ti, V	Resource : 1,270,000 t of 15% TiO_2 and 45% Fe. Potential for 177,800 t of titanium sponge	CMH, 1995-96, Stephanna Resources	NM 08/15/85, p.3 (Beaver Energy Resources)	Inactive, 8 claims
Bannerman and Horne (52G/5NW)	Stone	Quarry 1 : 60m x 5m (max) Produced : unknown Reserves : open	Unknown (formerly CPR)	MDC 27, p.18	Inactive quarry, Patent SN38
Barwick Peat (Arctic Peat) (Peatland R-20/21) (52C/12NE)	Peat	Area : 790 Ha at 2.85m thick Est. Resource : 22.5×10^6 m^3 Production (78-83) : n/a Production (93) : 164 t Reserves : open	Unknown	OFR 5489, Vol.8, p.6-13 ROA 1979-1983 ROA 1994	Inactive operation, Patented land and Open Crown Land
Bending Lake Prospect (52F/8SE)	Fe	Main Zone : 1500 m long x 300m wide at unknown grade (average of 34% Fe found by RGP staff, ROA 2000). Open pit reserves sufficient to maintain plant output of 2 Mt for 20 years.	LTV Steel	MDIR NM 14/04/77 (LTV Steel) OFR 6047, p.19 Table 16	Inactive, 70 patented claims MDIR file - K0133
Big Master (Kenwest Mine) (52F/7NE)	Au, Ag	Produced : 2,565 oz Au and 184 oz Ag from 14,470 tons. Indicated 1967 drilling: 30,000 t @ 0.36 opt Au. Old workings : 19,000 t @ 0.30 opt Au.	Goldcorp. Inc., Toronto; c/o David Sannes PCKRG	MDC 16, p.9	Inactive, patented claims HP366, HP373, HP301
		Proven & Probable: 123, 000 t of 0.30 opt Au and Indicated: 600,000 t of 0.22 opt Au.		CMH, 1988-89, p.92 (Canamerica Precious Metals Inc.)	
Big Whopper Pegmatite (52 L/07SE)	Li, Cs, Rb	Preliminary resource estimated at 11.6 Mt averaging 1.34% Li_2O and 0.30 Rb_2O.	Avalon Ventures	CMH, 2000-2001, p.45 (Avalon Ventures Ltd.)	Active, 12 staked claims.
Bonanza Mine (52F/10NW)	Au	Reserves : 5,000 t of 0.25 opt Au across a width of 0.3m.	CMH, 1994-95, p.386 (Wiscan Resources Inc.)	Van Horne Gold Expl. Inc. AF	Inactive, 59 claims K53304 (site)

Deposit Name/ NTS	Commo dity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Bonheur Quarry (52G/6SW)	Ballast	Produced : 3 quarry sites for 57,750 m^3 (pre-1937). Reserves : open	CPR	MDC 27, p.19	Inactive quarry, Patent TT25
By-Pass Gneiss (52E/15SE & 52E/16SW)	Aggreg.	Production : 2 sites used for the construction of Hwy 17A with unknown volumes. Reserves : closed	MTO	Personal Comm. MTO Staff	Inactive sites, Open Crown Land
Cameron Lake Deposit (52F/5SE)	Au	Resource : proven, possible and probable: 3,160,148 tons of 0.168 opt Au	CMH, 1995-96, p.275 Nuinsco Resources	CMH, 1995-96, p.275 Nuinsco Resources	Care and maintenance, 61 leased claims
Canadian Arrow Prospect (Dogpaw Lake) (52F/5SW)	Au	Indicated Reserves: 96,650 tons of 0.43 opt Au in 2 veins.	CMH, 1999-00, p.94 (Canadian Arrow Mines Ltd.)	NM 4/5/61 (Consolidated Golden Arrow Mines Ltd.)	Inactive, 17 claims
Canamerica E Zone (52F/7NE)	Au	Resource: 455 000 t of 0.117 opt Au indicated and inferred. Resource : 529 650 t of 0.103 opt Au indicated and inferred.	CMH, 1999-00, p.316 (Co-Maxx Energy Group Inc.)	NM 07/13/87, p.17 (Canamerica Precious Metals Inc.) Cochrane Oil & Gas Ltd., AF	Inactive, 45 claims
Cates Occurrence (52F/13SE)	Zn, Ag	Zone : 2,700m by 12m by 60m Reserves : 5.83 Mt @ 0.5% Zn and 0.5 opt Ag.	R. Fairservice	AF 52F/13SE M-1 to M-6 (Noranda) AF 52F/13SE B-1 to B-6 (Rio Algom)	Active, 9 claims
Cedar Island Deposit (Cornucopia) (52E/10SW)	Au	Production : 4,941 oz Au and 3,884 oz Ag from 17,050 tons. Preliminary reserves: 1,234,069 tonnes of 9.62 g/t Au (both Cedar Island and Mikado)	CMH, 1995-96, p.220 (Kenora Prospectors and Miners Ltd.)	MDC 16, p.13 CMH, 1995-96 p.220	Inactive, patented claims D212, D265
Coldspring Granite-Havik Lake Quarry (52L/1SW)	Stone	Produced : 3,388 m3 (97-99) Reserves : open	Coldspring Granite	ROA 1998-2000	Active Quarry, Claims 1160899-1160901, 1160905
Coldspring Granite –Pale Green Quarry (Palin Granite) (52L/1SW)	Stone	Produced : 6,169 m3 (92-98) Reserves : open	Coldspring Granite with surrounding claims by C. Nelson	ROA 1993-1999	Inactive Quarry, Lease CLM 418 and 13 Claims.
Coste Island Prospect (52E/7NE)	Soap-stone	Zone : 600m long x 64m wide Production : unknown Reserves : open	West half under W.L.L. P2379 and East half under E2376W.	MDF 52E/7NE (Coste Island) MDC 27, p.80	Inactive, OLL and Enhanced Land Management
Crystal Quartz Canada (Crystal Quarries) (52F/11SW)	Silica	Production : 25,759 t (91-95) Reserves : unknown	Crystal Quarries (Crystal Quartz Canada)	ROA 1991-1995	Inactive, 8 claims
Cygnet Lake Quarry (52L2/SW)	Stone & Aggreg.	Produced : 12,780 t (1992-95) Reserves : open	A. J. Minor & Sons	ROA 1992-1995	Inactive Quarry, Claims 1221219 and 1221220.
Dobie Deposit (52D/12NW)	Cu-Ni	Resource: 5.0 Mt @ 0.28% Cu and 0.24 % Ni	Nuinsco Resources and IR 11 (Manitou Rapids)	AF 52C/12NW B-3	Inactive, Patented landed and Reserve.
Dubenski Gold Prospect (52F/05SW)	Au	Drill-indicated resource of 355 286 tonnes grading 6.32 g/t calculated to a depth of 150 m.	P. Dubenski, Kenora PC	CMH, 1999-00 p.52 (Avalon Ventures)	Inactive, 22 Leased claims.

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Duport Mine (Cameron Island) (52E/11SE)	Au	Total geological reserves: 2.0 Mt of 0.35 opt Au. Proven and Probable: 944,000 t of 0.39 opt Au at 450 tpd. Estimated pre-production cost $52.8 million .	Unavailable	CMH, 1995-96 p.111 (Consolidated Professor Mines)	Active, Patented claims S.170, K1332, K1333, K2374
Dyment Quarry (52F/9NE)	Aggreg.	Produced : 1.29 Mt (1993-95) Reserves : open	Unknown (CPR via Broda Construction)	ROA 1993-1995	Inactive quarry, Patented land Lot 3 & Concession 5 of Melgund Twp.
Eagle Lake Soapstone Quarry (52F/11NW)	Soapstone	Produced : 174 t (1925-26) Produced : 547.5 t (1993-00) Reserves : open	Phil Thorgrimson	MDC 27, p.81 ROA 1994-2000	Active, Patented claim 1169628
Eagle Rock Prop. (Campbell Zone) (52F/2NE)	Au, Pt, Pd, Cu	Resources of 45m wide by 1000m long at 1.2 g/t Au-Pt-Pd, 4.8 g/t Ag and 0.5% Cu	Champion Bear Resources Ltd.	Press Release 2001-02-27 (Champion Bear)	Active operation, 28 claims
Electrum Prospect-W Zone (Fault zone or West Zone) (52E/11 NE)	Au	Zone : 61m x 2.1m x 19.8 m averaging 0.23 opt Au. Reserves : 100 000 tons of 0.33 opt Au in the P and W zones combined.	Celyn Alcock, Kenora, Ontario	OFR 5695,p.108 Laramide Resources Inc. Annual Report, 1987	Inactive, Patented and Leased claims K20696-K28663
Elora (Jubilee) (52F/7NE)	Au	Produced : 1,370 oz Au and 296 oz Ag from 13,766 tons Resource (Au) : Probable 13,500 t @ 0.18 opt Possible 215,000 t @ 0.18 opt Speculative 5,000 t @ 0.10 opt from the dump.	Unknown	MDC 16, p.15 OFR 5332, p.37 Table 8	Inactive, Patented claim HP 301
Evenlode Prospect (Eco Occurrence) (52E/11NE)	Mo, Au	Resource : 126,000 t @ 0.68% MoS_2 and 0.015 opt Au. Indicated: 200,000 t of 0.63% MoS_2 Inferred: 550,000 t estimated to a depth of 800 feet.	Patented claims – D. Smerchanski. Staked claims – D. Meek	OFR 5695,p.114	Inactive, patented claims K8705, K8707 and staked claims 1229467, . 1229468
F-Group (52G/14SE)	Cu, Zn, Pb, Ag	Original Resource (Dec/ 78): 0.63 Mt @ 8.10% Zn, 0.98% Cu, 0.49% Pb, 1.80 opt Ag. Reserves (Dec/82): 0.20 Mt @ 8.20% Zn, 0.80% Cu, 0.60% Pb, 1.80 opt Ag	Noranda	CMH 1979-80, p.194 (Noranda) CMH 1982-83, p.254 (Noranda)	Inactive, Patented claims PA312564-65, PA 312567-68 and PA226490-91.
Farlane (52L/1SW)	Stone, Aggreg.	Production: unknown volumes (sites 1 & 2 for stone and sites 3 & 4 for aggregate). Reserves : open	Open Crown Land (formerly CNR)	MDC 27, p.25	Inactive Quarry, Open Crown Land
Flambeau Lake Prospect (52F/10NW)	Au	Resource : diamond drilling partially outlines a zone with potential for 572,000 tonnes (Au grade unstated).	Alex Kozowy, Dryden, PC	AF 52F/10NW UU-1 and UU-2	Inactive, Patented claim AL88
Foley Mine (52C/10NE)	Au	Produced : 855 oz Au and 149 oz Ag from 5,568 tons. Reserves : 40,000 tons @ 0.5 opt Au proven/probable and 400,000 tons @ 0.5 opt Au speculative.	R. Cone, Fort Frances	MDC 16, p.16 NM 09/25/80 Seaforth Mines Ltd. OFR 5539, p.194	Inactive, Patented claims K475101, K475102, K475103

Deposit Name/ NTS	**Commo dity**	**Tonnage-Grade Estimates and/or Dimensions**	**Ownership References**	**Reserve References**	**Status**
Gaffney Prospect (52F/7SW)	Au	Resource : 300,000 t of 0.15 opt Au.	San Paulo Expl. Inc. (CMH, 1990-91, p.393)	CMH, 1990-91, p.393	Inactive, Patents K3594-3595
Gibbons Quarry (52E/9NW)	Slate	Produced : unknown Reserves : open	Unknown, W.L.L. C2366	MDC 27, p.58	Inactive quarry, Patent P156.
Golden Star Mine (52C/10NE)	Au	Produced : 10,758 oz Au and 34 oz Ag from 19,345 tons. Reserves: 20,000 tons of 0.42 opt Au and 35,000 tons of 0.15 opt Au (tailings dump).	PIRP Holdings Inc., AF 52C/10NE	MDC 16, p.20	Inactive, Patented Claim AL116, Leased Claim K44632
Goldlund Mine (52F/16NW)	Au	Produced : 111,891 @ 0.15 opt Au (Dec. 84). Reserves : 781, 000 t of 0.14 opt Au with 150,000 t. of 0.15 opt Au mineable by open pit.	Goldlund Mines Ltd	AF 52F/16NW 081 Locke Riche Minerals Ltd. CMH 95-96, p.223	Inactive. Patented claim KRL 18802
Gordon Lake Mine (52L/7NW)	Cu, Ni, PGE	Produced : 1,632,216 t of 0.78% Ni, 0.41% Cu and 0.026 opt Pd (Dec.71) Reserves : 110,000 t of 0.85% Ni and 0.35% Cu (Dec.71)	Unknown (formerly Cons. Canadian Faraday Ltd. then changed to Metal Mines Ltd.)	SMDR 000506 (edited)	Inactive, Mining Patents KRL 19096-97, 29065-66, 30055, 31373-74, 31823-26, 31829-32, 33206,33208,33210, 36272-74.
Grindstone Lake (52E/16NW)	Aggreg	Production : unknown Reserves : open	Open Crown Land (formerly CNR)	MDC 27, p.22	Inactive Quarry, Open Crown Land
Gummeson (52G/5NW)	Stone	Produced : 50 ft3 Reserves : Open	Kenora Granite Company Ltd.	MDC 27, p.22	Staked Claim 1185052
Hawk Lake Quarry (52F/13SW)	Aggreg.	Quarry : 400m x 200m x 30m *numerous crushed stone and sand piles on site (1993) Est. Production : 6.5 Mt Reserves : open	Unknown (formerly CPR)	AMIS Study 1993 MNDM	Inactive Quarry, Under OLL sites (1242, 1255, 1262)
High Lake Prospect (52E/11NE)	Cu, Mo, Au	Zone : 2000-foot long by 250-wide containing assay values of 0.10% to 1.35% Cu and 0.01 to 0.05 opt Au.	Celyn Alcock, Kenora, Ontario	GR 41, p.46	Inactive, leased claim K32307
Horne Granite-Butler Station (52G/5NW)	Stone & Aggreg.	Production from 1888-1989 and produced 633 m3 in 1989 By Nelson Granite. Reserves : open	J. & E. Hepp Duluth, MN (formerly CPR)	MDC 27, p.26	Inactive Quarry, Patents K561, K562, K563, K599 and K600
Junction Granite (52E9NW)	Aggreg	Quarry : 250m x 35m x 15m Est. Production : 131,250 m3 Reserves : none (used for road construction purposes only)	Unknown	Personal Comm. MTO Staff	Inactive , Patented land K5953
Kenbridge Prospect (52F/5NE)	Ni, Cu	Resource : 3,271,390 tons of 1.06% Ni and 0.54% Cu.	CMH, 1986-87, p.209, (Falconbridge Ltd)	GR 111, p.44	Inactive, patented claims K6672, K6634, K6635
Kenricia Mine (52E/10NE)	Au, Ag	Produced : 2,553 oz Au and 521 oz Ag from 24,344 tons Reserves : 53,201 tons @ 0.362 opt Au (1935).	Unknown	MDC 16, p.23 AF 52E/10NE E-1	Inactive, Patented Mining Land P211

Deposit Name/ NTS	Commo dity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Laurentian Mine (52F/7NE)	Au	Produced : 8,143 oz from 19,950 tons (grade 0.41opt). Reserves (Au) : Proven and Probable 50, 650 t @ 0.25 opt and Speculative 20,000 t @ 0.10 opt on dump	Unknown	MDC 16, p.24 OFR 5332, p.37 Table 8	Inactive, Patented Mining Land HP 371
Little Turtle Lake Soapstone Quarry (52C/15SE)	Soap-stone	Produced : 17 tons (1922-23) Reserves : open	Unknown	MDC 27, p.85	Inactive Quarry, Patented claim HP 141
Lockhart Lake (52C/10SW)	Zn, Cu, Au, Ag	Reserves : 6.1 Mt @ 1.06% Zn, 0.27% Cu, 3.2 g/t Ag and 0.006 g/t Au	Falconbridge	AF 52C/10NE Y-6 (Minnova 1989)	Inactive, Patented claims K417852-854, K418156-157, K446504-509.
Lyon Lake Zone (52G/15NW)	Cu, Zn, Pb, Ag	Original Resource : 3.945 Mt @ 6.53% Zn, 1.24% Cu, 0.63 % Pb, 3.42 opt Ag and 0.01 opt Au. Reserves : 695,000 tons of 10.34% Zn, 0.75% Cu, 1.62% Pb and 5.96 opt Ag	Noranda Inc. CMH 1992-93 P.256	CMH 1979-80, p.194 (Noranda) CMH 1990-91 P.332 (Noranda)	Closed Mine, Patented claim CLM 185
Marchington Road Deposit (52J07SE)	Cu, Zn, Pb, Ag	Resource : 150,000 tons @ 0.98% Cu, 3.11% Zn, 1.16% Pb, 1.97% Ag	Umex Inc. AF 52J/7SW 0024	Umex Inc. AF 52J/7SW 0024	Inactive, Patented claim CLM 337
Mavis Lake Prospect (52F/15SE)	Li, Ta	Reserves : 500,000 tons of 1% LiO_2.	CMH, 2001-2002, p.259, (New Claymore Resources Ltd.).	OFR 5718, p.151	Inactive, Leased claims K498288, K498289, K498290, K498292, K498308, K498140
Mattabi Mine (52G/15SW)	Cu, Zn, Pb, Ag	Original Resource : 13.66 Mt @ 7.50% Zn, 0.80% Cu, 0.77% Pb and 3.10 opt Ag. Reserves : 387,000 tons of 0.13% Cu, 9.28% Zn, 0.58% Pb and 1.77 opt Ag	Noranda Inc. CMH 1998-89 P.338	GR 221 p. 4 CMH 1988-89 P.338 (Noranda)	Closed Mine, Patented claims GTP Block 7
Maybrun Mine (52F/5NE)	Cu, Au	Production : 125,000 t @ unknown grades (Aug.73 to Dec.74). Resource : 2,824,825 t of 1.18 % Cu and 0.08 opt Au (1966)	CMH, 1995-96, p.108 (Consolidated Maybrun Mines Limited)	MDIR K0203 AF 52F/5NE P-1	Inactive, property on care and maintenance, Patented claims K15364-K15381, K15524- K15527
Mikado Mine (52E/10SW)	Au	Produced : 28,335 oz Au and 41 oz Ag from 57,813 tons Reserves (Au): Probable : 200,00 t at unknown grade with 30,977 t at 0.356 opt Au in the Grano Zone.	Kenora Prospectors and Miners	MDC 16, p.27 OFR 5695, p.220	Inactive, Patented mining claim D148
Mironsky Prospect (52C/11NE)	Cu	Zone : 122m long by 10m wide zone to a minimum depth of 90m averaging 0.53-1.01% Cu. Resource : 300,000 tons of 0.8% Cu (estimated).	Bond and Clark & Eveligh	MDC 29, p.42	Inactive, Staked claim 1238036
Nelson Granite - Forgotten Lake (52L/1SW)	Stone	Produced :5,278 m3 (97-00) Reserves : open	Nelson Granite And C. Nelson	ROA 1998-2001	Active Quarry, Leases CLM 427 and 13 Claims

Deposit Name/ NTS	Commo dity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Nelson Granite - Red Deer Quarry (52L/1SW)	Stone	Produced : 4,851 m3 (96-00) Reserves : open	Nelson Granite OFR 6047	ROA 1997-2001	Active Quarry, Leases 420, 9597, 9598, and 12 Claims
Nelson Granite - Scotstown (52F/13SE)	Stone	Quarry : 140m x 50m x 10m Est. Production : 70,000 m3 Now amalgamated with the quarry south of the highway.	Nelson Granite	AMIS survey 1993 MNDM	Active Quarry, Patents 594148, 11084 and 110885, Leases CL8436 and 8734 Claims 855993-94.
Nelson Granite – Shepody Quarry (52L/1SE)	Stone	Produced : 71 m3 (2000) Reserves : open	C. Nelson (Nelson Granite)	ROA 2001	Active Quarry, Claim 1178164
Nelson Granite – Snook Lake Quarry (52L/2NE)	Stone	Produced : 368 m3 (2000) Reserves : open	Nelson Granite	ROA 2000-2001	Active Quarry, Claims 1003742 and 1003744
Nelson Granite - Vermilion Bay (52F/13SE)	Stone	Produced : 40,258 m3 (94-00) Reserves : open	Nelson Granite	ROA 1995-2001	Active Quarry, Patent K59147, Lease CL4971, Claim 1220637
New Campbell Island Mines (Richard Lake) Prospect (52F/13SW)	U	Zone : 213m x 3m x 300m Resource : 650,000 tons of 0.10% U_3O_8	Unknown	GR 130, p.46	Inactive, Patented claim K18761
Norpax Mine (Reynar Lake) (52L/6NE)	Ni, Cu	Resource : 1,010,000 tons of 1.2% Ni and 0.5% Cu.	CMH, 1995-96, p.149 (Falcon Point Resources Ltd.)	Norpax Nickel Mines Ltd., AF	Inactive, Patented claims KRL350101 and KRL34767
Northern Penisula Mariposite (52E/10NE)	Mariposite	Zone : over 700m long x 7-8m thickness at a vertical dip. Produced : unknown (72-76). Reserves : open	R. Theriault	MDC 27, p.63	Inactive, Staked claim 1178801
North Kaskaweogama Prospect (52J/07NW)	Fe	Reserves : proven 405,000 t @ 28% Fe in 4 zones and a possible 50 Mt at unstated grade.	Open Crown Land	MDC 11, p 443	Inactive, Open Crown Land
North Pines Mine (52K/1SE)	Pyrite	Produced : 500,000 tons at 28% Fe (1909-21). Reserves : open	Allied Chemical	GR 101, p.36	Inactive, Patented claim HW 715
Northrock Mine (South Grassy) (52C/11NE)	Cu	Zone : 400m x 2-30m x 91m Reserves : 1,020,458 tons of 1.17 % Cu including 265,230 tons of 2.08% Cu.	Bond and Clark & Eveligh	OFR 5512, p.50	Active, 8 Staked claims.
Pidgeon Molybdenum Mine (52F/16NW)	Mo	Resource : 275,000 tons of 0.6 % Mo.	Unknown	OFR 5519, p.113 MRC 7, p.38	Inactive, Patented claim Pa 14051
Pinewood Peat (Peatland 52D-32) (52D/16SW)	Peat	Area : 1,180 Ha at 3.8 m deep Production : unknown Resource : 36.9 x 10^6 m^3	Unknown	OFR 5489, Vol.4 p.1-22	Inactive, Patented land
Pipestone Penisula Soapstone Quarry	Soapstone	Zone : Over 500m long x 23m wide and vertically dipping. Produced : four carloads Reserves : open	Open Crown Land, W.L.L. C-2366	MDC 27, p.89	Inactive quarry, Open Crown Land, W.L.L. C-2366

Deposit Name/ NTS	Commo dity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Polar Bear (Arctic Peat Moss) (Peatland 52C-44) (52D/12SE)	Peat	Area : 3,225. Ha @ 4.1m deep Volume : 110.5 x 10^6 m^3 Production : 15, 575 t (41-52) Reserves : open	Open Crown Land	OFR 5489, Vol.7 p.1-25 GR 107, p.28	Inactive, Open Crown Land
Port Arthur Copper (51C/15SE)	Cu, Zn	Produced : 26,509 lbs. Cu Est. Reserves: 48,895 tons of 1.18% Cu and 0.43% Zn.	W. Plamondon	Raoul Property Visit (2000)	Inactive, patented claim FF4261
Purdex Prospect (A-D Zones) (52E/11NE)	Au	Reserves: 1) 76 500 tons of 0.308 opt Au (indicated tonnage in 4 zones). 2) 241 000 tons at 0.226 opt Au in the P,A,B and C zones.	Unknown	OFR 5695, p.273 CMH, 1995-96 p.233	Inactive, patented claims K25130-131
Quarry Island (52E/15SE)	Aggreg.	Quarry : 50m x 30m x 1-4m Est. Production : 3000 m^3 Reserves : open	Unknown (formerly CPR)	Site Visit by RGP Personnel 2000.	Inactive quarry, Patented Land.
Quarry Island (52E/9NW)	Stone Piers	Production : 30m long face Reserves : open	Unknown (formerly CPR)	MDC 27, p.21	Inactive quarry, Patented Land.
Rainbow Quarry (52K/1SE)	Mari-posite	Trench: 46.5m x 1-3m x 1-2m Est. Production : 186 m3 Reserves : open	C. Kuryliw	MDC 27, p.58	Inactive quarry, Staked claim 1162920
Rainy River Zone 17	Au	Resource : 25.2 Mt @ 1.37 g/t Au	Nuinsco Resources	Nuinsco Resources Information Session Handout Wed., Sept.28/98	Active, Patented Land.
Regina Mine (52E/8NE)	Au, Ag	Produced : Over 8,000 oz Au & 1,460 oz Ag from 36,828 tons. Reserves (Au) : Speculative 19,650 t @ 0.44 opt and 30,000 t @ 0.106 opt in tailings.	Unknown	MDC 16, p.34 AF 52E/8NE Q-1 NM 07/25/88, p.7 Sweaney Gold Corp	Inactive, Patented claims P566-67
Revell Batholith (52F/9SW)	Stone	Quarry : 12m x 4.5m x 1m Est. Production : 54 m3 Reserves : open	Unknown	MDC 27, p.40	Inactive quarry, Patented land Lot 8, Conc. 2 Revell Township
Rush Bay Quarry (52E/10NW)	Flag-stone	Quarry : 100m x 12m x 4 m Est. Production : 4800 m3 (1978-86) Reserves : open	Canadian Shield Construction	MDC 27, p.59 (86)	Inactive quarry, Alienation 1516 (Rock Aggregate Permit)
Sakoose Mine (52F/9SW)	Au, Ag	Produced : 3,669 oz Au and 145 oz Ag from 8,828 tons. Reserves : 50,000 t @ 0.41 opt. Au.	Cantera Mining Limited	MDC 16, p.36	Inactive, Staked claim 1244771.
Scramble Mine (Homestake) (52E/16SW)	Au	Zone : 366m to 457m by 3.7m wide zone at 0.15 opt Au. Resources : 150,000 t at 0.24 opt., 1,500 t at 0.24 opt and 70, 000 oz (at 0.05 opt. cut-off) drill indicated.	Abitibi Consolidated Ltd.	NM 07/25/88 (Madeline Mines Ltd.) CIMM, Dist.4 Field Trip Guidebook, p.44	Inactive, Jaffray Twp., Con.6, Lot 13 and 14
Rocky Islet (CNR Quarry) (52C/11NE)	Ballast	Produced : 234,000 m^3 (1970) Reserves : open	Unknown (formerly CNR)	MDC 27, p.11	Inactive quarry, Patented land G-729.

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Straw Lake Beach Mine (52F/3SW)	Au, Ag	Produced : 11,568 oz Au and 1,049 oz Ag from 33,662 tons. Reserves (Au) : Probable 32,000 t @ 0.20 opt Possible 32,000 t @ 0.20 opt and 30,000 t @ 0.15 opt Spec. 48,000 t @ 0.20 opt	Unknown	MDC 16, p.38 OFR 5332, table 14, p.47	Inactive, 10 Patented mining claims K4021-4022, K4035-4040, K9037-9040.
Sultana Mine (52E/9NW)	Au	Produced : 15,977 oz. Au from 77,481 tons (0.21 opt). Reserves : none available	Patent is unknown, Claim-A. Roberecki	MDC 16, p.38	Inactive, Patented mining claim K489932 and claim 1086199
St Anthony Mine (52J/02SE)	Au	Produced: 331,069t @ 0.19 opt Reserves: 37,800t @ 0.18 opt	Unknown	MDC 13 p. 295	Inactive, Patented claim BG 154
Sturgeon Lake Mine (52G/15NW)	Cu, Zn, Pb, Ag	Original Resource (Dec/74) : 2.10 Mt @ 10.64% Zn, 2.98% Cu, 1.47% Pb, 6.14 opt Ag and 0.021 opt Au. Reserves (Dec/78) : 599,000 tons @ 2.34% Cu, 8.98% Zn, 1.30% Pb, 5.17 opt Ag and 0.018 opt Au.	Falconbridge	GR 211, p.4 CMH 1980-81, p. 102 (Falconbridge)	Inactive, Patented claim
Tabor Lake Mine (52F/9SW)	Au, Ag	Produced : 36 oz Au and 4 oz Ag from 87 tonnes. Indicated : 50,000 t @ 0.5 opt	Sulpetro Minerals Ltd., AF	MDC 16, p.39	Inactive, 37 patented claims, mine site on K502044
Thunder Lake Deposit (52 F/15SE)	Au	Resource : drill-indicated 3.78 Mt averaging 7.02 g/t Au (equivalent to 853,000 oz Au)	CMH, 1999-00, p.125 (Corona Gold Corp.)	CMH, 1999-00, p.125 (Corona Gold Corp.)	Inactive, Patented and Staked claims.
Trap Lake	Soapstone	2 Zones : Islands 246 & 249 (16.3 Ha and 0.3 Ha). Resource : open	Unknown	MDC 27, p.90	Inactive, Patented land K3829
Vanlas Prospect (Kidd Zone) (52F/10NW)	Au	Resource : 100,000 t of 0.20 opt Au.	Power Expl. Inc. Annual Report, 1988	Power Expl. Inc. AF 52F/10NW UU-1	Inactive, patented claim K70627
Victor Island Prospect (52F/5SE)	Au	Reserves : Drill indicated 300,000 t at 0.12 opt Au to a depth of 213m.	CMH, 1997-98 p.346 (Nuinsco Resources Ltd.)	MP 128, p.16	Inactive, patented claim K4712 Claims 690655, 718785
Wabigoon Prospect (52F/10NE)	Soapstone	2 Zones of 15-20m wide by 600m long Resource : open	Unknown	MDC 27, p.91	Inactive, Patented mining land HW 133
Watcomb Ballast Quarry (52G/14SW)	Ballast	Produced 130,000 tons/year from 1971-1991 (2.6 Mt)	Open Crown Land (Formerly CPR)	OFR 5889 p.27	Inactive quarry, Open Crown Land
Wendigo Mine (52E/9NW)	Au, Ag, Cu	Produced : 67,423 oz Au, 14,762 oz Ag and 1.89 million lbs. of Cu from 206,054 t Reserves (Au) : Vein 1 : 110m x 0.8m @ 0.33 opt Au (all of the production was from this zone). Vein 2 : 118m x 0.6m Vein 3 : 180m x 0.3m Vein 4 : unknown Tailings : 61,970 @ 0.027 opt Au.	Unknown	SMDR 001350 SMDR 001350 OFR 5695, p.352 OFR 5695, p.353	Inactive, Patented mining claims MH 208-210.

Deposit Name/ NTS	Commo dity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Werner Lake Cobalt (52L/7NW)	Co, Cu	Produced : recovered 389,363 lbs. of Co (1932, 1940-44); grades 2% Co and 0.75% Cu. Reserves : 1.01 Mt @ 0.31% Co and 0.29% Cu.	Canmine Resources	MDC 1, p.37 Press Release Canmine Resources Feb. 9, 1999	Inactive, Patented mining claim KRL 9383.
Whitedog Quarry (52L/2SW)	Aggreg & Stone	Production : unknown Reserves : open	Kenora Granite Company Ltd.	MDC 27, pg.45	Staked claim K1184320
White Quarry (52E/14NE)	Aggreg	Quarry : 650m x 120m x 20m Est. Production : 4.2 Mt Crushed Stone : 258,000 m3 on site (1993) Reserves : open	Unknown (formerly CNR)	AMIS Survey 1993 MNDM	Inactive quarry, Patented mining land CL 743
Wind Bay Prospect (52C/10NW)	Zn, Cu	Zone : 1300m x 46m x 10m Est. Resource : 1.79 Mt of 1.5% Zn and 0.2% Cu.	Unknown	OFR 5512, p.89	Inactive, Patented mining claim 594P

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Metric Conversion Table

Conversion from SI to Imperial			**Conversion from Imperial to SI**		
SI Unit	*Multiplied by*	*Gives*	*Imperial Unit*	*Multiplied by*	*Gives*
LENGTH					
1 mm	0.039 37	inches	1 inch	**25.4**	mm
1 cm	0.393 70	inches	1 inch	**2.54**	cm
1 m	3.280 84	feet	1 foot	**0.304 8**	m
1 m	0.049 709	chains	1 chain	20.116 8	m
1 km	0.621 371	miles (statute)	1 mile (statute)	**1.609 344**	km
AREA					
1 cm^2	0.155 0	square inches	1 square inch	**6.451 6**	cm^2
1 m^2	10.763 9	square feet	1 square foot	**0.092 903 04**	m^2
1 km^2	0.386 10	square miles	1 square mile	2.589 988	km^2
1 ha	2.471 054	acres	1 acre	0.404 685 6	ha
VOLUME					
1 cm^3	0.061 023	cubic inches	1 cubic inch	**16.387 064**	cm^3
1 m^3	35.314 7	cubic feet	1 cubic foot	0.028 316 85	m^3
1 m^3	1.307 951	cubic yards	1 cubic yard	0.764 554 86	m^3
CAPACITY					
1 L	1.759 755	pints	1 pint	0.568 261	L
1 L	0.879 877	quarts	1 quart	1.136 522	L
1 L	0.219 969	gallons	1 gallon	**4.546 090**	L
MASS					
1 g	0.035 273 962	ounces (avdp)	1 ounce (avdp)	28.349 523	g
1 g	0.032 150 747	ounces (troy)	1 ounce (troy)	**31.103 476 8**	g
1 kg	2.204 622 6	pounds (avdp)	1 pound (avdp)	**0.453 592 37**	kg
1 kg	0.001 102 3	tons (short)	1 ton (short)	**907.184 74**	kg
1 t	1.102 311 3	tons (short)	1 ton (short)	**0.907 184 74**	t
1 kg	0.000 984 21	tons (long)	1 ton (long)	**1016.046 908 8**	kg
1 t	0.984 206 5	tons (long)	1 ton (long)	**1.016 046 90**	t
CONCENTRATION					
1 g/t	0.029 166 6	ounce (troy)/ ton (short)	1 ounce (troy)/ ton (short)	34.285 714 2	g/t
1 g/t	0.583 333 33	pennyweights/ ton (short)	1 pennyweight/ ton (short)	1.714 285 7	g/t

OTHER USEFUL CONVERSION FACTORS

	Multiplied by	
1 ounce (troy) per ton (short)	31.103 477	grams per ton (short)
1 gram per ton (short)	0.032 151	ounces (troy) per ton (short)
1 ounce (troy) per ton (short)	20.0	pennyweights per ton (short)
1 pennyweight per ton (short)	0.05	ounces (troy) per ton (short)

Note: Conversion factors which are in bold type are exact. The conversion factors have been taken from or have been derived from factors given in the Metric Practice Guide for the Canadian Mining and Metallurgical Industries, published by the Mining Association of Canada in co-operation with the Coal Association of Canada.